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Established 1835

Railway & Commercial Gazette

Vol. CCXXX No. 6127

LONDON, JANUARY 23, 1953

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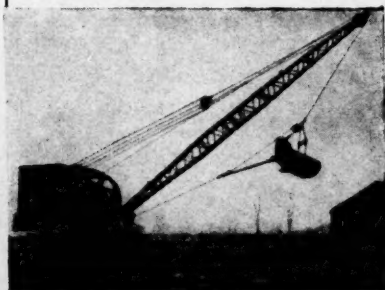
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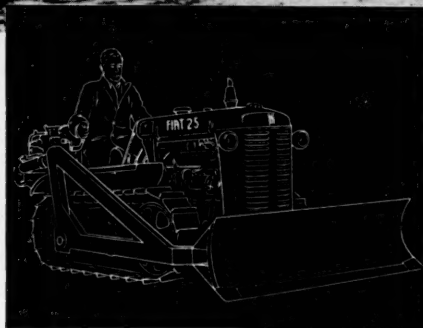
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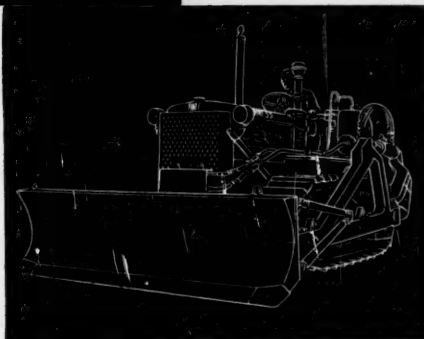


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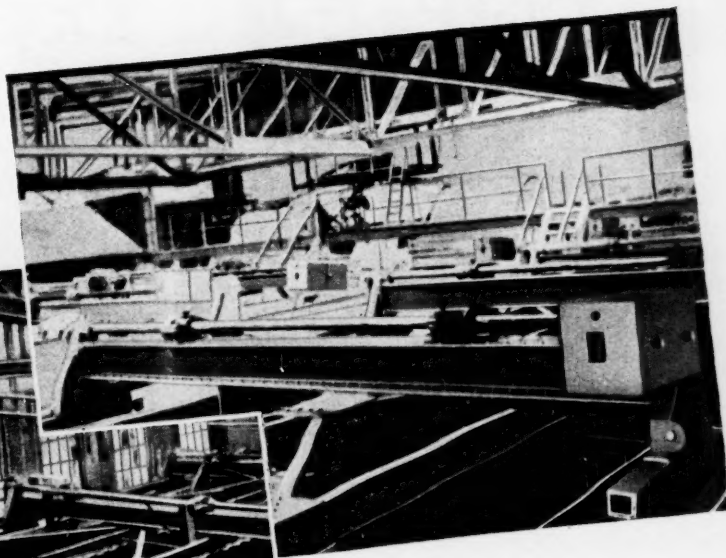
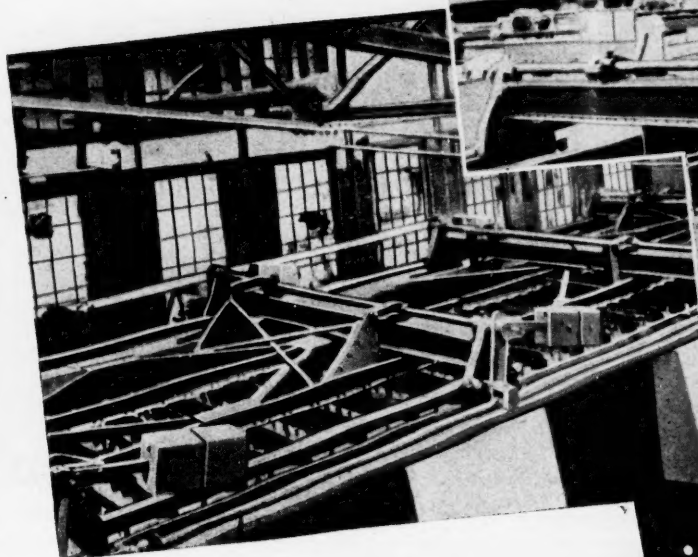
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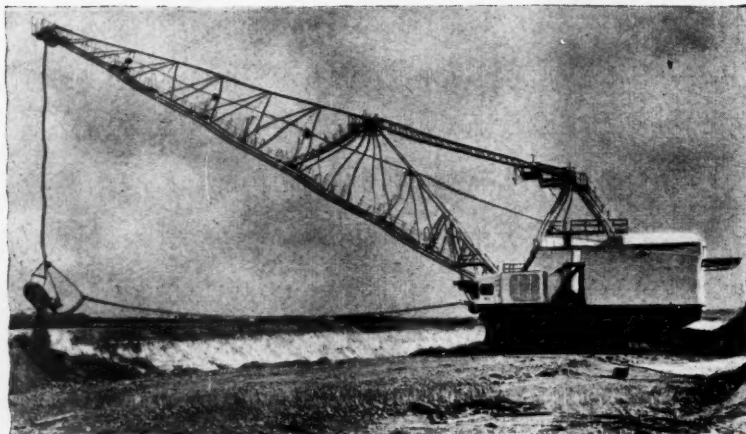
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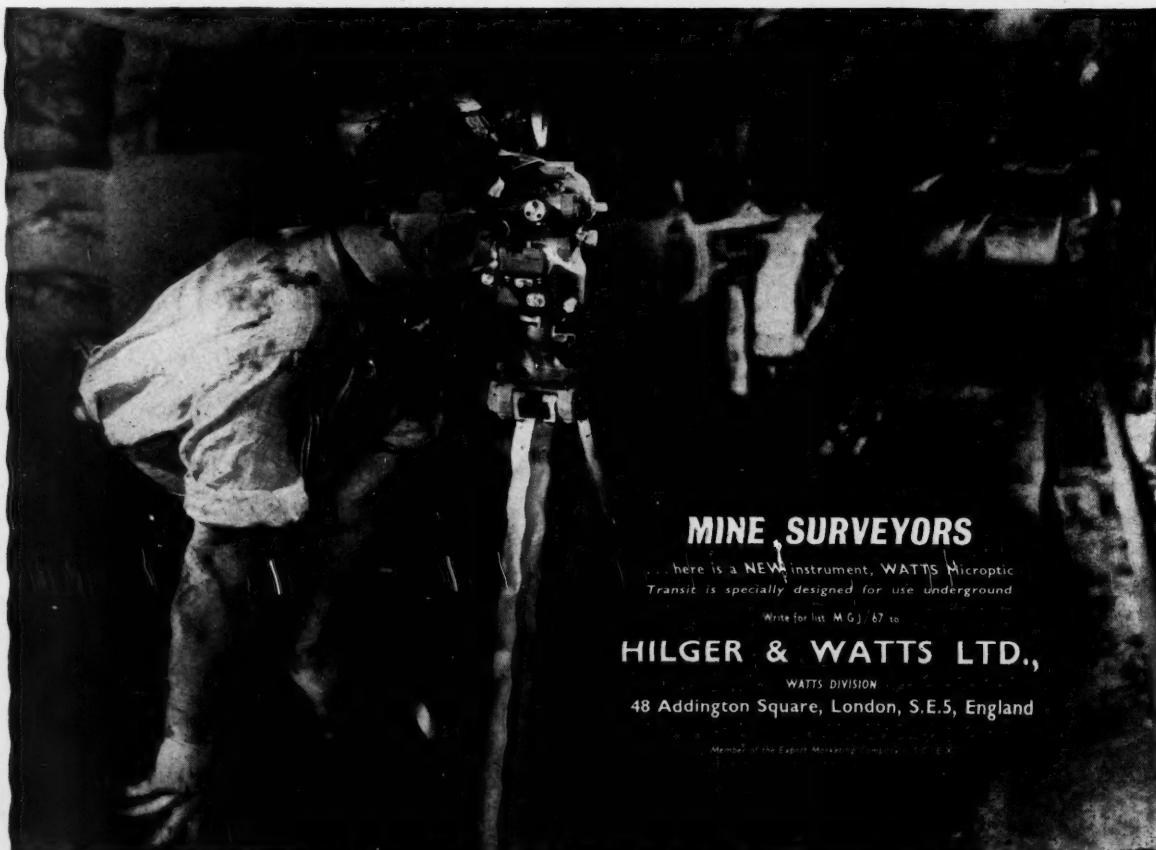
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CONTENTS

Notes and Comments	93
From Our Western United States Correspondent	95
Development Prospects in Brazil	96
Cementation Success in the Orange Free State	97
The Effect of Temperature and Humidity on the Working Efficiency of Miners	98
Reviews	100
Machinery and Equipment	101
Metals, Minerals and Alloys	102
The Mining Markets	105

Company News and Views	106
Gold Coast Selection Trust; United Tin Areas; Indians; Taxation of Uranium Industry.	
Company Shorts	107
Company Meetings and Announcements	108
Apex (Trinidad) Oilfields; Johannesburg Consolidated Investment Co.; Union Free State Coal and Gold Mines Ltd.; Anglo-Transvaal Consolidated Investment Co. Ltd.	

Published by The Mining Journal Ltd. at 15, George Street, London, E.C.4.

MANsion House 5511

Subscription £2 per annum

NOTES AND COMMENTS

The Future of United States Controls

The United States Government has laid a heavy hand on commercial freedom and private interests for the sake of the security of the United States, and the complexity of the position, which of course is not static, has made it extremely difficult to follow the activities of a number of departments and, indeed, to discern their respective jurisdictions and even priorities. The ultimate objective is national defence which to a great extent connotes assistance on a big scale to the rest of the free world, and its ramifications are necessarily involved; all this has contributed not a little to the confusion of international markets especially in the products of the mineral industry.

In a New Year statement, Mr. Henry H. Fowler, Director of the Office of Defence Mobilization, discusses the current defence position at considerable length. "We have come a long way but defence mobilization is still in mid-passage" is his general summary of the situation at the end of the year. Tasks of the future, on which it is impossible to set a time limit as yet, he catalogues as (1) the completion of equipping the expanding of the national Forces and provision for reserve stocks of weapons; (2) the furtherance of research and technology; (3) systematic action to complete and maintain the mobilization base; and (4) the integration with allied nations of a joint production effort. Particular attention is directed to the stockpiling of materials for the needs of the whole free world.

United States stockpiling, up to the present, has been designed principally to cover national deficiencies in time of war, but the critical margin of production by the United States allies must, he stresses, depend in many instances upon the general store of materials available and the contingency of a major war, and the allies must either accumulate or have access to the stockpiles accumulated at all bases, and held as a war reserve.

During 1953 it is expected that as regards the major metals—steel, aluminium and copper—allocations can be modified progressively to confine allocations to military and atomic energy and to meet stockpiling needs, while providing an overall allocation for civilian economy with the exception of only a few particular forms and shapes. Various other materials, especially some of the ferro-alloys, are likely to remain for some time in a state of severe excess of demand over supply. To remove allocation con-

trols and limitations generally would not only hamper the military production programme but would intensify the difficulties of stockpiling.

As much of the supply of raw materials needed, more especially in the production of alloys, must be sought in countries outside the United States large supplies of specialized plant are a prerequisite for securing these additional supplies, and commercial shipments, of a value of \$300,000,000 in the form of tools, heavy machinery, generating units and other equipment have been channelled to overseas producers of critical commodities.

Dealing with the supply position more in detail, the U.S. steel capacity at the end of last year was approximately 116,000,000 s.tons and should rise to 123,000,000 s.tons by the end of the current year.

Primary aluminium capacity should exceed 1,500,000 s.tons by the middle of next year—double the capacity at the middle of 1950. This estimate has set the pace for extension of aluminium fabrication plants.

Closely allied to the aluminium production is the question of available electric power. The present capacity is somewhat in excess of 81,000,000 kW. compared with 63,000,000 kW. when the Korean emergency began; the target at the end of 1955 is at present 116,000,000 kW. to be further enlarged to 123,000,000 kW. a year later. Owing to the shortage of hydro-electric power, aluminium supplies have been short and deliveries to stockpile consequently deferred. The output for the fourth quarter of last year was 345,000 s.tons but the output should rise to 440,000 s.tons a quarter in each of the two last quarters of the current year. Incidentally power curtailments in the Pacific North-West and the Tennessee Valley cut supplies by 42,000 tons in the last quarter of 1952.

As regards copper, substantial increases in supply are not in sight before 1954 when some of the big developments in the field of mining operations should mature. The outlook for the availability of copper for civilian use is considered slightly less favourable in the current year than in 1952 though the total supply is estimated at 2,590,000 s.tons in the current year as compared with 2,485,000 s.tons in 1952. The total supply of domestically mined copper was 2,030,000 s.tons in 1950 and this should be increased to 2,270,000 tons by the beginning of 1955.

The International Materials Conference has now suspended allocation for most metals and minerals with the

exception of copper, molybdenum, and sulphur and a review of the situation will be made at the end of January to decide if copper also may be freed from allocation.

Production, distribution, and inventory controls have been lifted on zinc, lead, cadmium, bismuth, sulphur and sulphuric acid, methylene chloride, and artificial graphite. In the case of tin, metal for non-Governmental use is freed from import regulation, allocations are discontinued and use limitations eased slightly. Allotment of C.M.P. materials should be sufficient to meet military and atomic energy requirements in full, and lend maximum support to the construction of electric power and aviation gasoline facilities besides permitting increased use of steel for roads, freight cars, schools, hospitals and consumer durable goods.

As to the future Mr. Fowler is convinced that the provisions of the D.P.A. concerning output and distribution controls should be extended after the present control expires on June 30 next; especially is this control necessary to secure the future stockpile position. The amount now on hand is estimated to be slightly more than half the dollar value of the current objectives. Of a total of \$5,800,000,000 available to the military services since Korea for the expansion of production capacity nearly half has been spent. The programme is essentially fluid but the end of the stockpiling period is obviously still far off and its continuation may reassure producers of ores and metals at any rate against the apprehension of any general fall in the market price of their products.

It must of course be borne in mind that Mr. Fowler's report represents the mind of the outgoing Democratic administration which in Ex-President Truman's view has produced a record prosperity for the Union which may be expected to last throughout 1953 though two years hence there may be a recession. It now remains to be seen whether and in what directions President Eisenhower and Congress will modify or change the pattern of their predecessor's planning.

Aspects of the Steel Bill

The Government is at present the almost monopolist producer and the principal seller of British steel; very shortly its interest will be focussed on selling the steel plants. The passage of the Bill for the reversion of the industry to private ownership promises to be less stormy than was first indicated. Mr. Duncan Sandys has placated some of the opposition. He has entered into friendly discussions with the T.U.C. upon the provisions affecting the interests of the workers and has so far met the criticisms of the foundrymen as to secure the support of the British Steel Founders Association which had previously been pressing for the exclusion of the foundries from the ambit of the Bill.

In his handling of these negotiations Mr. Sandys has been both skilful and tactful. He has agreed to exempt the foundries from the obligation imposed upon the steel industry to submit development schemes for official approval and to limit the Boards' power to fix maximum prices for castings and forgings to cases where monopoly or restrictive practices exist. But there will still be power to examine a company's records.

The Government amendment have now been tabled. One of the first tasks of the House of Commons is to be the further consideration of the Bill which it is hoped will reach the Statute Book possibly at the end of April and certainly before the Coronation.

Disposal of the assets of the British Iron and Steel Corporation may be a long and tedious process but the attractions of steel as an investment have undoubtedly been enhanced by the recent resounding achievements in production, the vast extent of capital re-equipment of the industry and the assurance of an eager market for the

enormous increase in output which is promised in the current year. Much may depend upon the removal of physical restrictions upon capital investment, but it is calculated that more steel will be available for export, and despite the keener competition which is developing, British costs are below American or even European levels. British steel therefore seems to be assured of continued prosperity and its further modernization—envisaged in the second £3000,000,000 development plan—is the best indication of the confidence of the steel masters in the further progress of this key industry.

Birth of a State Geological Survey

The immense importance of Northern Rhodesia as a copper producer has been responsible for a great stimulus to a geological study of the territory and a Government geological survey was initiated in July, 1950, the project being made possible through a Colonial Development and Welfare grant. The Survey was attached to the Department of Labour and Mines until the end of 1951 after which the Geological Survey became a Department of its own. Of course this does not mean that a very large amount of geological mapping and study had not previously been accomplished by private enterprise.

Between 1923 and 1940 several concession companies had prospected and mapped some 156,000 sq. miles, which left 132,000 sq. miles still to be dealt with. This unmapped area includes the whole of Barotseland—the subject of special agreement between the paramount chief and the British South Africa Company—which is not open to prospecting. The director of the Geological Survey, Mr. W. H. Reeve, who operated in the country between 1930 and 1933 and who subsequently went to Kenya, in his annual report for 1951, which bears the date at the end of last February, gives some account of field operations during 1951 and projects for 1952. The field operations last year were centred in the south-eastern portion of the Protectorate embracing particularly some 12,000 sq. miles lying between the railway and the Zambesi valley, south of latitude 16°, and another area of 10,000 sq. miles in the eastern province embracing the North Charterland Concession. Interest was chiefly directed towards the investigation of possible occurrences of coal of commercial grade, the lack of which leaves the copper industry in the territory so largely dependent on the successful operation of the Wankie Collieries and adequacy of the railway.

Naturally this is a question which has long exercised commercial interests and resulted in the formation in 1949 of the Northern Rhodesia Coal Syndicate, consisting of the B.S.A., the four copper mining companies, and the Northern Rhodesia Government. Prospecting however, so far, has had no practical economic success, and the verdict of the Director of the Survey is that while there is probably a vast amount of coal in the mid-Zambesi region, investigations so far do not give grounds for optimism regarding the prospect of finding seams of either workable quality or extent. However, a deeper borehole than any yet attempted is being drilled below the Kafue Flats. The only other mineral deposits reported are a very low-grade vermiculite in the Mazabuka area and occurrences of clay, suitable for brick or tile making in the Lusaka area.

Two members of the Survey were engaged in studying the possibilities of a Kafue Gorge hydro-electric scheme with a power-station in the Keshya Ravine and in directing the diamond drilling programme preliminary to the construction of a dam, a full report on which will follow later. In connection with the present difficulties regarding the employment of African labour in higher grades of skill, it is not uninteresting to note that it is hoped to train Africans, in connection with mineralogical and petrological work as Africans elsewhere have shown a high degree of skill in this line.

Western United States

(From Our Own Correspondent)

Portland, December 24

Casualties among lead and zinc mines due to the low prices of the metals continue. Those affected are not only the smaller mines operating at limited profit and frequently on marginal ores but some of the really large companies, such as Kennecott, Anaconda and Empire Zinc which have closed down or sharply restricted operations at some of their zinc-lead units rather than operate at a loss or deplete their ore bodies when the market scarcely allows them to break even. Practically every Western state is affected and in addition the Northwest is slowed down by a shortage of hydro-electric power due to a season of unprecedentedly low precipitation. Principal sufferer is the aluminium industry of Oregon and Washington where it is estimated there is a daily loss in production of 165,000 lb.

Labour troubles in the copper industry are not yet over. While three companies of the "Big Four" reached agreements with the Mine Mill and Smelter Workers Union last fall Kennecott has held out and despite some rather strenuous sessions had not reached an agreement at last report. Meanwhile uncertainty prevails in the copper price situation. D.M.P.A. has made contracts with several high cost producers to pay premium prices for their product, estimated to be about 10 per cent. of the country's output, the remaining 90 per cent. being sold at the ceiling price of 24 $\frac{1}{2}$ c. A new directive on the price situation is expected soon.

The Atomic Energy Commission reports that "nearly a million dollars" has been paid in bonuses to stimulate and encourage uranium production. Most of this has gone to small operators in the Colorado Plateau region which is now believed to be the second largest source of uranium in the world, with 5,000 men engaged in the various operations and an annual expenditure of \$30 million.

ARIZONA

Atlas Mining Co. has commenced shipment under a contract which calls for supplying 20,000 tons of manganese ore to U.S. Manganese Corporation.

COLORADO

U.S. Vanadium Corporation has doubled the capacity of its Uravan mill which is now the largest plant in the Colorado Plateau region for the treatment of uranium ores. A new process is being installed for the treatment of carnotite ores with high lime content. Climax Molybdenum Co. expects to be producing from its Storke level early in 1953. The Storke is a new level driven 300 ft. below the Phillipson which has been the mine's main adit for some years past. The new crushing plant on the Storke level will house a 60 in. Symons gyratory crusher. As by products Climax produces cassiterite, wolframite and pyrite and is working on a lubricant which is made by regrinding and refloating concentrates until a grade of 99.2 per cent. MoS_2 is attained.

IDAHO

Silver Mountain Lead Mines, Inc. has effected a merger of seven properties northeast of Mullen at the eastern end of the Coeur d'Alene district. The enlarged holdings total 2,500 acres in a well mineralized area. A contract has been made with Sullivan Mining Co. for development of the ground under a profit sharing agreement.

NEVADA

At Anaconda's Yerington project approximately one-fourth of the 10 million tons of overburden has been removed.

Stripping is by 5 cu. yd. shovels and 25 ton trucks. Ratio of waste to ore is 1 $\frac{3}{4}$ - 1. Copper content of the ore is approximately 1 per cent. and development is planned for a daily output of 11,000 tons, yielding 60 million lbs. of copper per year. Oxide reserves are estimated at 35 million tons which will be treated by leaching. Beneath the oxide ore is an undetermined amount of sulphide which does not enter into present calculations.

Manganese Incorporated, operating the Boulder Dam area, has commenced production at its mill at the Three Kids mine. This mine was a producer of shipping grade ore during World War I by selective mining but the grade deteriorated and the mine closed down. The deposit is large and during World War II persistent attempts were made to develop a satisfactory process for beneficiating the lower grade ores but these were not commercially profitable. After extensive research Manganese, Inc. worked out a process of concentrating and nodulizing and has commenced operation on a 1,350 tons per day basis. Reserves are estimated at 5 million tons averaging 20 per cent. Mn.

NEW MEXICO

Uranium activity is increasing in the northwestern portion of New Mexico, the Colorado Plateau area. Anaconda is building a mill after development has proven sufficient ore to justify it and Shattuck-Denn is carrying on extensive surface and underground development on a lease which adjoins holdings of Anaconda and the Santa Fé Railroad which owns a large acreage in New Mexico with excellent showing of uranium minerals. To date the Navajo Indian tribe has been paid approximately \$600,000 in royalties and leasing fees on land in the reservation and is planning to establish a tribal enterprise to carry on uranium mining on Indian owned lands. In order to obtain fuel for its uranium mill at Bluewater Anaconda expects to open a small coal mine near Grants in the same area.

OREGON

After two years of exploration and testing M. A. Hanna Co. of Cleveland, Ohio is making plans for erection of a plant to treat a large deposit of nickel ore near Riddle in Douglas County. The existence of the deposit has been known for years and the grade is better than average but the character of the ore has presented difficulties in recovery which have finally been worked out in the Albany, Oregon laboratory of the U.S. Bureau of Mines. Details of the operation are not available as yet but some idea of its magnitude can be gained from the fact that the Government has approved accelerated amortization of an investment of \$22 million.

UTAH

Vitro Chemical Co. has increased the capacity of its uranium mill at Salt Lake City from 165 to 350 tons per day. This is the largest plant in the country for the treatment of ores of uranium that are not associated with vanadium. Columbia Iron Ore Co. is producing 10,000 to 20,000 tons daily of 50 per cent. iron ore from its open pit operation at Iron Mountain. The pit has an area of one square mile and has been worked to a maximum depth of 200 ft. Ore is shipped to the company furnaces at Geneva, Utah. Columbia is a subsidiary of U.S. Steel.

An important source of strategic, steel toughening tungsten will be developed under a contract signed between Utah Construction Co. and the Republic of Korea, calling for the company to rehabilitate and improve two Korean tungsten properties, the Sangdung and Dalsung mines, which rank among the world's best sources of high grade tungsten ore. Tungsten deliveries to the U.S. over a five year contract period are expected to exceed \$50,000,000.

Development Prospects in Brazil

(From Our Own Correspondent)

Teresopolis, January 8

The October issue of the *Readers' Digest* contains what is described as a condensation of a book by Mr. Willard Price under the title of the *Amazing Amazon*. It is not clear from this notice whether Mr. Price distinguishes between the Amazon region—Amazonia—and the Amazon Watershed or Basin. Amazonia is generally taken to mean the States of Amazonas, and Pará and the territories of Guapure, Acré, Rio Branco and Amapá, in other words the geographical position known as North Brazil.

The Brazilian section of the Amazon Watershed, however, extends through 25° of latitude from Cayenne to Belo Horizonte, in Minas Geraes and the North of Sao Paulo; it thus covers one half of the entire country and includes the greater part of the known mineral reserves.

If Mr. Price is referring only to Amazonia he appears to be highly imaginative. While it embraces 41 per cent. of the entire country it harbours only 3.5 per cent. of the population and contributes less than 1 per cent. of the national wealth. The greater part is, and will remain for many years, inaccessible except from the air as it is criss-crossed by a network of rivers, tributaries of the Amazon, Negro, Solimoes, Madeira and others, which preclude railway construction and make the cost of road building prohibitive. Transport is restricted to the rivers, many of them unnavigable in the dry season and overflowing their banks in the rains. Over other waterways, even the more important ones, navigation is obstructed by numerous falls and rapids.

Mr. Price emphasizes the prospects of what he calls "the Great Diagonal" under which title he appears to refer to the direct air route from Rio to Manaus which the National Air Mail, operated by the Brazilian Air Force, recently surveyed and laid down several emergency landing fields. The "string of thriving towns with airfields, farms and factories" at present exists only in Mr. Price's imagination and there is no prospect of any real development.

UNPRODUCTIVE OIL DRILLING

The statement that a good part of Brazil is believed "to float on oil" is certainly imaginative. Drilling has been abandoned as unproductive at Limoeiro, Pará, and Carolina (Maranhao) and is now being tried at Marajo Island and on the Paraná-Sao Paulo border. So far the only point at which it has been proved to exist is in the state of Bahia, north of the capital.

It is quite possible that oil may be found in larger quantities elsewhere but so long as the present nationalist ideas prevail, prospecting and drilling cannot be speeded up. The nationalists are a relatively small but a very aggressive minority, and the last two Governments do not seem to have had the courage to withstand them. The Petroleum Bill was amended in the Chamber of Deputies in such a way that the participation of foreign capital is rigidly excluded. There remains a faint hope that the Senate may delay dealing with it until wiser councils prevail but it is a somewhat faint one.

The Department of Mineral Production, in a comprehensive report of Brazil's mineral resources in 1942 wrote: "The Amazon valley covered by an extensive tertiary mantle is the least known and least prospected (region of Brazil). In it are only known . . . the Gold of Amapá and Calcoena; Tertiary lignites in Javari and Ica; diamonds

in the Quino Valley; and diatomite on the Manacapurec." Since 1942 the only important discoveries have been the Manganese and iron ores of Amapá, referred to from time to time in the *Mining Journal*.

MINERAL RESOURCES OF THE AMAZON VALLEY

This territory, less swampy than much of the country to the West, also has deposits of cassiterite, tantalite, columbite, ilmenite, rutile, zirconium and monazite, all of which await further investigation. Bauxite is known to exist in Pará, though it is not exploited, and there are unconfirmed reports occurrences of coal, copper, bauxite, quartz, sulphur and tin in Rio Branco.

Brazilians generally are sceptical as to the Amazon's prospects. Although the 1946 constitution under the influence of idealists obliges the Union to devote 3 per cent. of its revenue from taxation each year to economic developments in that backward region, it is doubtful if the big sums allotted will do more than improve health conditions and prevent utter stagnation.

On the other hand, as the Government urgently requires U.S. aid, it is not likely to resist American pressure. American interests have recently been allowed to collaborate in the Amapá and Urucum mineral reserves and when protests against the exportation of raw minerals arose, the Government compromised by inserting a clause in the Bill permitting "exports between Governments." In spite of Nationalism foreign capital is showing increasing interest in Brazil as an investment market. A large number of manufacturers from the U.S.A. and Europe, including France, Germany and Italy, are transferring part of their activities to this country and I am glad to say that several old-established British firms have lately decided to do likewise.

AN INCREASE IN INDUSTRIALIZATION

There has been a spectacular increase in industrialization here during and since the last war. In ten years the number of manufacturing establishments has increased from 49,418 to 89,086, the available capital from £360,000,000 to £1,033,500,000 and the value of production from £349,600,000 to £3,345,000,000. Progress has been accelerated during the past two years in spite of the inadequate transport system and the shortage of skilled labour. Development, however, has practically been confined to Minas Geraes, Sao Paulo, Rio de Janeiro and the South.

The Brazilian-Bolivia Railway from Corumba, in Mato Grosso, has nearly reached its terminus at Santa Cruz de la Sierra, whence a short extension will take it to Cochabamba, at the junction of La Paz and Buenos Aires lines. Thus putting the Atlantic port of Santos through by rail to the Pacific ports of Arica, Mollendo and Antofagasta as well as to Buenos Aires. Under the agreement Brazil is to participate in the development and exploitation of the Bolivian oilwells in the Santa Cruz region. The railway has been built in obedience to the Treaty of Petropolis and may aid development of the isolated Santa Cruz zone and prevent Argentine interference in the oil industry, of which Bolivia is apprehensive.

So far only very scrappy extracts from the Paley Report, so extensively published in the *Mining Journal*, have appeared in the local press and despite its many references to the mineral possibilities of Brazil, appears to arouse little interest in official circles.

Cementation Success in the O.F.S.

The following article, recently received from our South African correspondent, gives details of the cementation processes used at No. 2 Shaft, Free State Geduld Mine, which has twice been flooded since September 9 last year. After a comprehensive description of the methods used to counter the first inrush of water, the author mentions the new methods used in the face of the second emergency. It is considered that the original cementation held, but that the footwall rock formation was not sufficiently strong to withstand the considerable water pressure.

The trouble in the shaft started when badly fractured ground was encountered during shaft-sinking below the 5,350-ft. level early in September last. The shaft was then very close to its final planned depth. Some water was encountered in this broken ground and it was decided to install a 35-ft. deep concrete plug in the shaft to resist the pressure of water coming from the shaft bottom and to form a stable basis from which to continue cementation operations before the resumption of normal shaft-sinking. This concrete plug was installed and two or three pipes were left running through the concrete into the shaft bottom, so as to facilitate cementation.

On September 9 water was encountered in two development headings at the 5,350-ft. level a short distance from the shaft perimeter. The flow of water from these two headings, together with water issuing from the shaft bottom and from other sources in the shaft, totalled 43,000 gallons per hr. This was not an unmanageable flow and arrangements were immediately put in hand to equip a station at 4,350 ft. to pump more than 43,000 gallons per hr. At the same time cementation "rangers" (pipes for carrying cement) were installed in each of the two headings, as close as possible to the face, in preparation for normal cementation operations. While these arrangements were in progress, there was a sudden breakaway and water came flooding into the shaft at the rate of 95,000 gallons per hr. This rate of inflow was too great for the existing pumping equipment and the water level in the shaft gradually rose.

THE CEMENTATION OPERATION

Various methods of dealing with the situation were considered and it was finally decided to attempt cementation. For this purpose it was necessary to allow the water to find its own natural level in the shaft; and balers were used to check the rise of the water in the shaft for just long enough to enable the mine staff to strip the underground pump stations and salvage materials and equipment.

When salvaging had been completed, it was decided to bring forward the date on which the water in the shaft would be at its natural level—by pumping water from other sources on the surface into the shaft. Pumping of water into the shaft began on September 16 at the rate of 18,000 gallons per hr. and was successively increased over the ensuing three weeks until 80,000 gallons per hr. were being pumped into the shaft on October 5. The water level reached 52 ft. from the shaft collar on October 6 and it was then considered that the pressure of water in the shaft more than counterbalanced the pressure in the fissure; and, in fact, water was then flowing back into the fissure from the shaft. The stage had thus been reached when cementation operations could begin.

Meanwhile, an attempt had been made, when the water level in the shaft had reached 399 ft. from surface, to inject cement into the shaft bottom by means of the pipes running through the concrete plug. The pressure encountered by the pump injecting the cement reached 1,000 lb. per sq. in. A breakdown occurred and cementation through a second pipe into the shaft bottom was attempted. A test bucket was sent down to the concrete plug, and when it was brought to the surface cement was found in it, proving that the flow of water into the shaft was still too great for cementation.

With the water level in the shaft brought up to 52 ft. from the surface, injection of cement through the ranger into the left-hand heading started on October 6. At that time it was estimated that water was flowing out of the shaft at the rate of 50,000 gallons per hr. The following morning, after cementation had been in progress for some hours, it was found that water was flowing out of the shaft at the rate of only 36,000 gallons per hr. This rate remained constant for 10 hr. On this evidence it was decided that the fissure in this heading had been sealed. Cementation was stopped, 3,013 pockets of cement having been used.

In the afternoon of October 7 injection of cement into the right-hand heading started and by the following day the absorption of water from the shaft had fallen to 20,000 gallons per hr., at which rate it remained constant for six hr. Again, on this evidence, it was decided that the fissure in the second heading had been sealed and injection was stopped after 3,999 pockets of cement had been used.

For safety, a further 1,000 pockets of cement were injected into each of the two headings. More than 12,000 pockets of cement were used during the cementation.

At this stage there was reason for some confidence that the fissure had been sealed, but it was necessary to adopt precautions against a further outbreak: there was always the risk that, as water came to be pumped or baled out of the shaft, the pressure of water in the fissure would break through the seals. Accordingly, rafts were constructed to hold pumps, so that these could be lowered on to the water in the shaft and used to pump the shaft dry. While these rafts with their pumps were held in readiness for any emergency, there was fortunately no need to use them. At the same time, pumps were obtained from many sources, so that pumping stations could be installed at intervals down the shaft to handle any sudden inrush of water there might be. No fewer than 34 pumps of different makes and capacities—some of them able to lift 40,000 gallons of water per hr. to a height of over 3,000 ft.—were obtained.

BALING BY WINDING HOIST

Baling started on October 10. Two winding hoists were used, with a set of two balers operated by each of them. The balers were each able to handle 1,300 gallons and the two sets were able to empty the shaft at the rate of 60,000 gallons per hr. As baling proceeded and the water level fell in the shaft, it was deemed advisable to establish pumping stations in the shaft at 1,000-ft. intervals, each with a capacity of well over 100,000 gallons per hr.—as a further precaution against any new inrush of water from the sealed fissure. The blasting of new pump stations or the enlargement of existing ones involved pauses in the baling operation. For instance, at 3,000 ft. the main pumping station had to be enlarged to accommodate five 40,000 gallons per hr. pumps; and this work, together with the installation of the pumps, took 18 days. A final intermediate pumping station was established and equipped at the 4,750-ft. level; and baling continued thereafter until the 5,350-ft. level was cleared of water. At that time a temporary pumping station was being rapidly installed at this level, pending the establishment of a main pumping station, with five pumps each able to lift 40,000 gallons of water per hr. to the main pumping station at 3,000 ft.

At this stage in the operations, the recovery of the flooded shaft in little more than three months represented a considerable triumph of engineering skill and good organization. It showed also the success of the technique of cementation carried out under most difficult conditions more than 5,000 ft. away from the seat of the trouble.

A FRESH INRUSH

Since the foregoing information was received, however, a fresh inrush of water in No. 2 shaft Free State Geduld has undone some of the excellent work of sealing the previous breakthrough. According to engineering opinion, it would appear that the previous work held, but that the footwall rock formation was not strong enough to withstand the pressure, which is said to be in the order of 2,500 lb. per sq. in.

When the shaft was dewatered, work started on the installation of plugs in the two headings from the shaft at the 5,300 ft. level. These were designed to allow the pressure of water seeping into the headings to force the level up to the main pump station at 3,000 ft. which would lift it to the surface. One of these had been completed. The other was nearly finished when the fresh inrush occurred.

New tactics are now being used to deal with it. The first

stage is to allow the water to reach a level in the shaft sufficient to cause a reverse flow of water into the headings and thus into the fissure. As a first step, water is again being pumped into the shaft from local sources, from No. 1 Shaft and by pipeline from Western Holdings. The actual depth of the shaft is approximately 5,465 ft., and from this point to the 5,350 ft. level it is intended to fill the shaft with broken rock and cement as a subsequent operation to the pumping activities mentioned. The plug will then be installed and will reach a height of 100 ft. from the 5,350 ft. level. The plug itself will consist of broken stone and cement, the stone to be introduced through a 15 in. column and the cement to be injected through 1½ in. columns left in position for this purpose.

Once the reverse flow has been established and the rock is in place, cementation through these pipes will start. According to calculations, rock and cement should fill the headings and the shaft bottom, sealing off the flow of water. Once this has set, the shaft will be dewatered and at a later stage the shaft will be sunk through the concrete slab in the shaft, but the headings will not be touched and the station cut at another point.

All going well, the shaft should be dewatered in a shorter time than on the previous occasion. It is considered that the technique being used now is the most economical and the fastest possible to deal with the situation.

The Effect of Temperature and Humidity on the Working Efficiency of Miners

By A. G. THOMSON

The effect of heat on the productive efficiency of underground workers is a study which is growing in importance as mining in all parts of the world is carried on at progressively deeper levels. Investigations carried out in many countries and in various industries have in general shown that the effect of physical environment on the worker depends largely upon the nature of the work performed. Thus no one set of conditions of temperature, humidity or air movement can be specified as standard. In the following article the author briefly outlines the progress of physiological research on the effects of hot and humid environments, and continues by presenting examples of the effects of high temperatures on miners in different parts of the world. In the later portion of the article he emphasizes the relationship existing between temperature and accidents, and suggests that the human problems arising out of man's physiological and psychological limitations demand an application of knowledge provided by co-operation between medical and engineering specialists.

Only in comparatively recent times have intensive researches on human reactions to heat and humidity been carried out. Among other investigators, Crowden has pointed out¹ that the progress of physiological research on the effects of hot and humid environments has largely depended on progress in other fields, notably in air conditioning engineering, and on the development of scientific instruments for the convenient and accurate assessment of the physical characteristics of the environment, namely temperature, humidity, air movement and radiant heat.

Investigations carried out at the Research Laboratory of the U.S. Bureau of Mines at Pittsburgh eventually showed that various combinations of dry-bulb, wet-bulb temperatures and air movement produced the same sensation as that experienced in still, saturated air at a definite temperature, which was termed the Effective Temperature. While these experiments were resulting in the development of an Effective Temperature Scale, parallel experiments conducted elsewhere showed that physiological reactions to the thermal environment closely followed changes in Effective Temperature. Two Effective Temperature scales were constructed, one for persons normally clothed according to American custom, and another known as the Basic Scale, for workers stripped to the waist.

To-day the physiology of labour has been extensively studied in various countries and in different industries, and medical scientists generally have accepted the principle that man's capacity for activity depends to a very great extent on the

control and maintenance of relatively constant conditions in respect of certain physical and chemical characteristics of his internal environment. Observations in manufacturing industries have yielded much data of value to the mining industry. In general, these observations have shown that the effects of physical environment on the worker depend largely upon the nature of the work performed, so that no one set of conditions of temperature, humidity or air movement can be specified as standard.

EFFECTS OF HIGH TEMPERATURES ON MINERS

Numerous studies of the effects of high temperatures on miners have been carried out. In 1921, Orenstein and Ireland² described an investigation into the working capacity of African mine labourers. At selected points in the mine the labourers were put to work on a rotary ergometer or a hammer ergometer, so that the work done could be measured. A very marked decline in output was observed in hot, moist and stagnant places. At a wet-bulb temperature of 87° or 88° F., with low air-movement, the efficiency was only about 55 per cent. of that at a temperature rather more than 60° F.

When an air-cooling plant was installed at the Morro Velho gold mine in Brazil, it reduced the wet-bulb temperature in the deepest working by as much as 9° F. (from 89° to 80° F.) and the output from the mine as a whole rose by 12 per cent.⁷

Vernon, Bedford and Warner³ made observations on individual miners in British coal mines. Since the difficulty of hewing coal varies substantially, even in the same mine, it was not possible to accept the weight of coal won as a valid measure of the rate of working. The time spent in short rest intervals was therefore noted, and as an indication of working speed the time required to fill a 10 cwt. tub with coal was recorded. When the wet-bulb exceeded about 70° F. the miners worked more slowly and took a greater aggregate time for rests. The estimates of rate of production were based on the assumption that, except for the time taken for rests, work continued steadily at a speed comparable with that with which coal was filled into tubs. It was found, however, that in the hottest working places rests due to causes beyond the control of the individual miner cost more time than in the cooler places. Estimates of rate of production were therefore recalculated using the ratio of the actual time spent at work to the possible working time when the involuntary stoppages had been taken into account. On this basis, it was estimated that when the wet-bulb temperature averaged 74° F. and the mean air speed was only 25 ft./min., efficiency declined by 14 per cent., while in the hottest places, where the air was stagnant (mean bulb temperature 79.3° F. and air speed 10 ft./min.) the decline was 26 per cent.

Now that coal is being mined at increasing depths and consequently at higher temperatures, alleviation of the thermal stress to which workers in the deeper mines are subjected has become still more important.

In 1946 Caplan⁴ reported an experimental study on the effects of heat on the efficiency of Indian labourers in the deep mines of the Kolar goldfield. No decline in efficiency was noted until the wet-bulb temperature was several degrees above the level at which the efficiency of British coal miners begins to decline. Caplan attributes this difference to a more moderate rate of working at the lower temperatures, his explanation being that in common with other natives of tropical countries the Southern Indian labourer adjusts his habitual rate of working to that demanded by tropical conditions. Another possibility is that on account of tropical illnesses the peoples of Southern India are incapable of the same rate of working as the average European worker. It was found that over a three-hour shift the efficiency began to fall when the wet-bulb temperature rose to above 83° F. Caplan estimated that in a normal shift of six hours the decline in efficiency at such a wet-bulb temperature would be about 60 per cent.

RELATION OF TEMPERATURES TO ACCIDENTS

Research workers have also established that the incidence of industrial accidents is influenced by temperature. Following the installation of the air-cooling plant at the Morrão Velho goldmine, the number of fatal accidents declined. In the sixteen months after the plant was installed, there were only six fatal accidents, compared with twenty in a similar period before air-cooling was begun.

Observations in British coal mines showed that the incidence of accidents for which workmen's compensation was paid was substantially affected by temperature. Records were obtained of all such accidents incurred by 18,000 underground workers employed at ten collieries for two periods each of two years, and surveys were made of the atmospheric conditions in each seam at each colliery. Among coal face workers the accident rates for the two statistical periods respectively were 77 per cent. and 30 per cent. higher in the seams where the temperature exceeded 80° F. than in those where it was below 70° F. The curves for other workers employed underground had similar slopes.⁵

The accident liability of these miners was affected by age. Taking the figures for all the seams at the collieries together, both the frequency and the severity rates for accidents were at a minimum in men aged between 30 and 39 years. Further sub-division of the data for coal face

workers according to the temperatures of the working environment showed that the relation between age and accident frequency was much affected by the temperature. In the cooler coal seams, where the temperature was below 70° F., the accident frequency rate was least in the 40 to 49 group. Where the temperature was between 70° and 80° it reached its minimum level in the 30 to 39 age group, rose slightly in the next decade of age, and increased sharply at ages of 50 years and over. In the hottest group of seams, with temperatures of 80° F. or more, the minimum frequency was again at ages of 30 to 39 years, but at higher ages the incidence rose sharply. It is considered probable that this temperature effect on the incidence of accidents among the various age groups is a result of the fatigue caused by hard work done under severe conditions of temperature.

Miners who become overheated by working in hot places are liable to some chilling at the end of the working shift as they return to the surface. Observations in anthracite mines have shown that the chilling may be considerable and rapid. Vernon, Bedford and Warner³ obtained records of absenteeism and were able to show that for both coal face workers and other underground workers there was a distinct excess of sickness absenteeism in the hotter pits.

APPARENT MAXIMUM TEMPERATURE

Under conditions of heat and humidity and poor ventilation, a worker has to rest periodically out of sheer physiological necessity to cool off, the sensation of fatigue which makes him do so being a warning of danger that unless he lessens his own body-heat production by ceasing to perform muscular work he may collapse. If he fails to rest, he not only runs the risk of collapse but probably bodily discomfort and fatigue render him less aware of risks and so make him more prone to accidents. What are the limited conditions of temperature to which miners should be exposed?

Eichna and his colleagues⁶ made some highly significant observations on young soldiers, nude or wearing only cotton shorts, who marched at 3 miles an hour carrying a 20 lb. pack. The effective air speed was that caused by the marching (i.e., about 260 ft./min.). At wet-bulb temperatures below 91° F. these men worked easily and efficiently, but as the wet-bulb temperature rose above that figure they were increasingly liable to become heat casualties. On the Kolar goldfield Caplan found that in Indian mine labourers heat collapse occurred rarely when the wet-bulb temperature did not exceed 90° F. and the dry-bulb temperature was between 110° and 120° F. At wet-bulb temperatures of 91° to 93° F. heat casualties began to occur.

From the data obtained by Eichna and Caplan, it seems evident that a wet-bulb temperature of about 90° F. is the highest at which unclothed men should be made to perform long spells of relatively hard work. This conclusion requires considerable qualification. In the first place, it should be remembered that Eichna's soldiers were all young and physically fit. It does not necessarily follow that because in a few experiments they were able to withstand certain extremes of temperature and humidity, the same resistance would be shown by a typical group of miners of all ages. A still more important point is that in studying the effects of temperature on miners, the aim should not be merely to determine the extremes which might be just tolerable for a short time during an emergency but might have unfavourable long-term effects on health. The mining industry is concerned with providing conditions which the miner is prepared to accept for the whole of his working life.

Nowadays there is widespread acceptance of the principle that workers must at all costs be protected from both the short-term and long-term effects of occupational hazards. It is quite obvious that for economic reasons it may not be possible to provide optimum conditions in many existing mines. Once the health and safety of the miners has been safeguarded, the degree of additional efficiency which can

usefully be achieved will be governed by cost considerations. For example, it might be more economic to operate a mine with men who are only 60 per cent. efficient than to strive for 100 per cent. efficiency at an excessive cost. Acceptance of the lower standard, however, should be based on the assurance that the comfort and welfare of the workers are adequately protected. Cost and dirt money are no longer regarded as any justification for failure to take energetic measures against such hazards as heat or dust.

Another point which has emerged very clearly is that the application of scientific knowledge to human problems arising out of man's physiological and psychological limitations demand the co-operation of medical men, physicists, chemists, engineers, and other specialists. The engineer, however skilled in his particular profession, requires the guidance of a medical man who knows about causative effects, while the medical man is usually quite incompetent to remedy the troubles which he is able to diagnose. No single man knows the answers to all the problems associated with the effects of temperature on underground workers. Only by team work can modern engineering knowledge and methods be applied to the solution of problems associated with the effects of heat, humidity, and other environmental conditions on efficiency and health.

It is noteworthy that at the Fourth Empire Mining and Metallurgical Congress, held in Great Britain during 1949, a session was devoted to Heat and Humidity. Six papers were presented at this session on subjects which included the physiological effects of high-temperature and humidity on workers in the mining and metallurgical industries, acclimatization of Bantu workers on the Rand, the effects of high environmental temperatures on underground workers on the Kolar Gold Field, a review of environmental conditions in British coal mines, and working conditions in the British iron and steel industry.

In a brief review of the papers and discussions the chairman emphasized the need for more research work and for better co-ordination of research work between mines in different countries and between research establishments and the mines where high temperatures are experienced. He considered that if engineers and research workers could pay more visits to different mines and research establishments, it would broaden their outlook and approach to these problems and provide opportunities for exchanging ideas. The chairman concluded that the following fields for research were indicated: 1, The measurement of energy output of men working in deep mines; 2, The effect of different conditions on the efficiency of working; 3, The mental effects of high temperatures; 4, The development of practical methods of measuring acclimatization; 5, Development of methods of working which reduce the liberation of dust to the minimum and methods of collecting dust which is unavoidably liberated.

Stress was also laid on the need to make the results of research work and experience affecting heat and dust problems more easily and promptly available to those who are interested by collecting this information from the many publications in which it appears and disseminating it direct to those who want it. A comprehensive and up-to-date bibliography would be useful.

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REVIEWS

Russian Non-Metallic Mineral Ores: Treatment and Recovery Methods, by M. A. Eigeles. Published in Moscow, 1952. Pp. 560 with illustrations. Available in the British Museum, North Library. Printed in Russian.

In this work, the chapters on some of the principal non-metallic minerals in Russia, such as asbestos, graphite, the talcs, kaolins, quartz, clays and ceramic materials, cement materials, building stones and the like, are of particular interest. With most of these, detailed information is given of the localities and nature of the deposits, with full description of methods of dressing, concentrating, and general beneficiation.

Taking the chapter on asbestos by way of example, a very full account is given of the history of the industry, although the author considers indeed that little technical progress was made until after the revolution and the Lenin-Stalin regime was fully established. Then progress was rapid and substantial, especially through the engineering research of Prof. K. K. Liandov, I. G. Protasov, and other engineers. Beneficiation by the so-called friction method was developed, yielding fibre of exceptionally high quality; afterwards supplemented by special pneumatic methods. These latter include the well known fish-tail suction pipes over shaking tables or screens. Most of the commercial asbestos types are represented, such as anthrophyllite in the amphibole group; chrysotile (the most important industrially) among the serpentines; and tremolite, crocidolite, and the less known amosite in the hornblende group. Details are given of their classification according to Russian standard No. 7-51 (GOST) and mechanical and other properties.

Apart from these final chapters on the principal non-metallic minerals, the greater part of the volume is devoted to crushing, grinding, screening and separating machinery and methods; air and water classification; washing, jigging, and concentration by gravity. Flotation in theory and practice, and flotation reagents are thoroughly dealt with, including several industrial flow-sheets and systems. Other concentration methods comprise sorting and separating machines, selective thermo-grinding or by friction, spiral separators (wet method) and grease tables, e.g. for diamonds. There are chapters, too, on design and layout of plant, control and laboratory work, analysis, and costing.

In a fairly long introduction the author states that there is no need to doubt the sufficiency of mineral supplies in Russia—though he is at present only concerned with the non-metallic group. The great need is, in the words of the famous Russian scientist of the 18th century, Lomonosov, to apply the necessary knowledge and energy (in his book *The Earth's Crust*). In addition to a general mineralogical outline some account is given of the development and organization of mining research in Russia, especially since the revolution. In recent years the mining industries have grown to gigantic dimensions, more particularly in the beneficiation sections, using huge plant and machinery, far surpassing that of other countries. Imports of several kinds of minerals ceased and an export trade grew up. In addition to asbestos and graphite, reference is made to baryta, phosphorites, apatite kaolin, talc, limestone, and others.

Theoretical and practical research was inaugurated on a large scale. To A. E. Fersman belongs the chief credit of first emphasising the supreme importance of this industry to the national economy. Several research institutes, mineral dressing technical colleges, etc., have been established, many of these in connection with large industrial undertakings. The most important of these is the Research Inst. for Mechanical Treatment of Minerals (Mekhanobr). Another, especially for non-metallics, is the All-union Inst. for Minerals (known as the VIMS) established by decree of 1918. Theoretical work goes closely hand in hand with practical in relation to: (a) metal ores, (b) coal and other fuels, especially oil, and (c) non-metallic ores. Prof. G. O. Chechott of Mekhanobr was one of the first leaders in this scientific work, especially in regard to schools of mining, including VIMS, Mekhanobr, and others in Moscow, Leningrad, Dnepro-Petr., etc. Others are the Inst. Gornokhim. Mat. (Inst. of Min. Chem.) and the Urals Indust. Inst. Many of these are associated with the Akad. Nauk SSSR (Academy of Science, U.S.S.R.). Several triumphs are claimed for all this scientific work. For example, Soviet research workers are said to be the first to develop effective methods of treating talcs, magnesite, and other materials.

MACHINERY AND EQUIPMENT

The General Electric Company in 1952

During 1952 the General Electric Company Ltd. produced an impressive volume of equipment for municipal and industrial installation, of which a considerable proportion was destined for use on mining properties in many parts of the world. In 1952 the chrome ore treatment plant supplied to Sierra Leone Chrome Mines Ltd. began operations, a plant designed to produce concentrates required both for metallurgical purposes and for use as refractories. The crushing section of this unit accommodates 150 tons of ore in 8 hr., and the concentrating section approximately 100 tons per day. The total installed motor power of the unit is 220 h.p. and water consumption is approximately 360 gallons per min., much of which can be recovered.

Other equipment included a heavy media separation plant designed for West Africa. This is to treat 100 tons per hour of manganese ore of minus $\frac{1}{4}$ in. plus 28 mesh containing some 60 per cent. manganese ore. Separation will take place at 2.73 specific gravity. Three special Sherwen screens are used for draining the sink product and three similar screens for the waste product. Nearer to home, the Bessemer Laboratory of the Royal School of Mines was considerably modernized, and one complete room devoted to the dry crushing of ores. Forty years ago the Erith Works provided the metallurgical and mineral dressing equipment for the laboratory, then newly built, and last year G.E.C. collaborated with the School authorities in the renovation of the machines and the provision of new plant.

Electric winders and haulages were provided by the Company for such places as far apart as Odendaalsrus and South Wales. Four 4,200 h.p. geared A.C. winders for a new mine near Odendaalsrus, O.F.S., were commissioned last year, and stand as the units to use the new scheme of dynamic braking and motor control described in *The G.E.C. Journal* of October, 1949. The new system of speed control is being applied also to two geared A.C. winders for collieries in South Wales. That installed at the Cwm Colliery will be the first winder in the country to operate at 11 kV. Other winder equipments included two 3,700 geared D.C. units for the Silverwood East and Cadeby Main Collieries of the N.E. Division, N.C.B., and in addition sixteen electric haulages are in hand for the N.C.B. Other equipments include 67 portable mining substations for collieries throughout Britain.

A complete coal blending and handling plant was supplied to the order of Simon-Carves Ltd. for the steel works of John Summers and Sons Ltd., a comprehensive contract was received for a complete ore handling, crushing and screening plant for the Kapitalna Iron Works of Yugoslavia, and extensions are being made to the coal handling plant at Littlebrook Power Station in Kent. The original plant was installed by Fraser and Chalmers Engineering Works Ltd., and their new equipment will serve the augmented generating equipment now being built. The handling equipment supplied by G.E.C. for the S.S. Carl Schmedeman was described in *The Mining Journal* of January 9, 1953.

Signalling and control units for coal face cutters have been manufactured during the year as well as shaft signalling units for two deck cages, and the Pirelli-General Cable Works has received an order from the Aluminium Company of Canada for the manufacture and installation of a 0.4 sq. in. single conductor, oil filled cable and sealing ends to form a 750 yd. termination for an overhead line operating at 301 kV., 3 phase, with centre point earthed. This is one of the highest voltages at which an industrial cable is at present operating anywhere in the world.

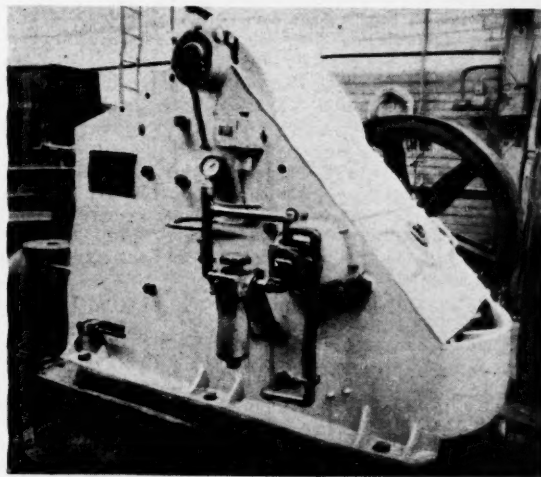
A New Type Drill in the Netherlands

A firm at Edam in the Netherlands, named the Netherlands Tool Manufacturing Company, recently started the large-scale manufacture of twist stone drills with hard metal bits capable of drilling holes in all types of stone. The special feature of these drills is claimed to be that the hard metal bit is attached to the shank in such a manner that the heart of the drill is sufficiently protected and it is almost impossible for the bit to become loose.

The positive cutting angle of the drill guarantees a high cutting speed even in the hardest stone and the spiral body of the drill is stated to enable the stone dust to be discharged quickly. These new drills can be used in braces and in hand and breast drilling machines, electric or otherwise. The firm is making the units in diameters of 4-30 mm. ($\frac{1}{8}$ - $1\frac{1}{8}$ in.) and in lengths of 70-325 mm. (2.7-13 in.). In special cases, thicker and longer drills are supplied.

A Range of Balanced Jaw Crushers

The objective of the Kue-Ken crushing principle is to crush by pressure and thus avoid rubbing or abrasion. The range of Balanced Jaw Crushers, sealed in oil and manufactured in this country by Sir W. G. Armstrong Whitworth and Co. (Ironfounders) Ltd., on rights from Straub, America, attains a path



The Model 56 Kue-Ken Jaw Crusher

of travel of the jaw plates squarely against the subject rock. The manufacturers state that this motion is maintained because the hinge pin is located well above, and substantially on, the line that passes through the crushing zone formed by the two jaw plates.

The 19 crushers within this range grade from the model 22 to the 110S. The model 22 has a feed opening of 12 in. by 24 in., and operates at a usual speed of 365-425 r.p.m. For ordinary conditions this unit requires an electric motor of between $7\frac{1}{2}$ to 10 h.p. and its total weight is approximately 3,225 lb. Its production capacity ranges from 4 tons per hr. with jaws set at $\frac{1}{4}$ in. dimension, to 11 tons per hr. with jaws set at 1 in. dimension, the maximum for the unit. The largest member of the range, the model 110S, has a feed size of 42 by 27 in. and a usual speed of 300 to 350 r.p.m. This unit requires electric motorization under normal conditions at between 50 and 60 h.p. Its total weight is 30,495 lb. and its capacity ranges from 142 tons per hr. at $3\frac{1}{2}$ in. dimension to 200 tons per hr. at 6 in. The capacity ratings given are said to be conservative, and are presented as neither maximum nor minimum owing to a wide variation in the crushing characteristics of different rocks. If petrol or diesel engines are used, they should be approximately 15 to 25 per cent. larger than the electric motors indicated. The model 56 crusher depicted in the accompanying photograph has a feed opening of 24 in. by 12 in., a usual speed of 365 to 400 r.p.m., and a maximum indicated crushing capacity of 50 tons per hr. at 3 in. jaw dimension.

A feature of the jaw adjustment measures used is that the original and correct geometry of the toggles is never altered. The normally stationary front jaw is firmly held against the front cross members, and loosening the front holding bolts permits the bottom of the stationary jaw to be swung towards the movable jaw. Spacer bars may then be inserted to reduce the jaw setting or bars may be removed to increase the setting.

METALS, MINERALS AND ALLOYS

COPPER.—In his recent and final Economic Report to Congress President Truman had the following observations to make on the outlook for copper :

"Copper appears to be the scarcest of the three basic metals. Fabricators of copper products, however, have recently been rebuilding their inventories. While potential supplies should not fall significantly short of demand for current use during 1953, they are somewhat deficient in terms of stockpiling objectives. Consequently, contemplated second quarter 1953 allotments are only slightly higher than fourth quarter 1952.

"Taking the longer view, it is expected that military requirements will soon begin to decline modestly, the extent depending heavily not only upon ammunition use in Korea, but also upon how rapidly progress is made in substituting steel for copper in shell cases. The price of imported copper is still above the ceiling price established for domestic supplies, and the outlook for a narrowing of this differential depends upon the rapidity with which supplies improve and upon the foreign suppliers."

That this view of the copper situation is generally accepted in Washington is shown by the fact that the Patterson Bill to continue the suspension of the import duty on copper has been passed by the House of Representatives and has now been sent to the Senate where it is expected to get quick approval.

In Chile it appeared possible earlier this week that the wage disputes which both Annaconda and Kennecott have on their hands might be settled before the deadline was reached for further strikes which in the case of El Teniente is on Sunday and in the case of Chuquibambilla on Monday.

The N.P.A. has allocated 127,000 tons of copper for February delivery including 55,000 tons of foreign metal. New York reports active demand for copper with sales for March delivery already being made. Domestic producers are now reported to be selling on the basis of price at time of delivery rather than a fixed 24½ c. so as to benefit from any forthcoming increase there may be in the domestic ceiling price. As matters stand, the copper price control regulation is, in any case, due to expire on April 30, unless renewed.

The following are the American Copper Institute's figures of world refined copper production and stocks expressed in thousands of s. tons, both for December and for the whole of 1952 compared with 1951 :

	Production			Stocks		
	Dec. 1952	Jan.-Dec. 1952	Jan.-Dec. 1951	Dec. 31 1952	Nov. 30 1952	Dec. 31 1951
U.S.A.	113,965	1,189,112	1,199,784	58,858	69,237	71,528
Other countries..	100,374	1,196,422	1,225,018	130,103	131,527	152,203
World	214,339	2,385,534	2,424,802	188,961	200,764	223,731

Comparing the year's results with 1951 it must be remembered that the Copper Institute figures for countries other than the U.S.A. exclude several important producers, namely, Russia, Japan, Australia, Norway, Sweden and Yugoslavia, production from these countries during 1951 having totalled approximately 450,000 tons. Disregarding this incompleteness in the Institute's figures, it would appear that world refined copper production in 1952 was lower than in 1951, perhaps by as much as 40,000 tons, and that world stocks declined over the year by a similar amount.

Yugoslav copper production in 1952 is reported to have amounted to 33,000 tons of blister plus 19,000 tons of electrolytic compared with 32,000 tons of blister plus 14,000 tons of electrolytic in 1951. Production of ore was also up by around 100,000 tons for the year at 1,300,000 tons. Production from the Bor mine is said to have been decreasing, but plans are in hand to offset this by the exploitation of deposits in the Majdanpek district in the eastern part of Serbia.

Reference was made in this column a few weeks ago to the smelter which will in due course be in operation at the Home of Bullion Mine, 180 miles north of Alice Springs in Australia's Northern Territory, which will treat ore from this mine and other deposits in the Territory to avoid uneconomic freights across the continent. Ore reserves at the Home of Bullion Mine itself were recently reported to be in the neighbourhood of 500,000 tons of high-grade ore and although the mine is still in the development stage production on a small scale should begin in one to two years.

LEAD.—The Port Pirie strike negotiations again broke down at the end of last week, the company's settlement terms being apparently unacceptable to the Unions. The Broken Hill Associated Smelters is quoted by Reuter as saying that if its proposal for settlement was not acceptable the company would have no alternative but to withdraw it and apply to the Industrial Court for an award.

As is to be expected in this situation, lead prices are firm at the moment with the New York 14 c. level appearing well established. At the beginning of this week U.S. sellers were reported to have disposed of about 90 per cent. of January intake and 35 per cent. of February supplies.

ZINC.—Although U.K. zinc prices have fluctuated during the week they are substantially unchanged on balance and the East St. Louis price remains unchanged at 12½ c., although demand appears to be light and sellers are reported to be having difficulty in disposing of their full January intake.

The Ministry of Materials has amended its arrangements for selling zinc through the Government Broker so as to provide that all sales for delivery outside London will carry a premium, which in the case of Liverpool delivery will be £1 a ton. The Ministry holds a substantial stock of zinc at Liverpool and prior to the introduction of this premium it had been possible to buy prompt zinc through the Government Broker for delivery in Liverpool at the same price as for delivery London, whereas the ordinary broker was having to pay additional freight charges to get his zinc to this area.

TIN.—The R.F.C. is reported to have purchased a further 5,000 tons of tin from Bolivia, which it is stated "would cover production from Bolivian mines in October, November and December of 1952." The R.F.C. emphasizes that this is essentially a single purchase and that no long-term contract is involved. With Bolivian production presumably running at around 30,000 tons per annum it would seem clear from this statement that the Bolivian Government has not sold the whole of its fourth quarter production to the R.F.C. and therefore has two or three thousand tons in hand which could be sold to the Williams Harvey smelter (whose representatives reached La

U.K. PRIMARY METAL STATISTICS—NOVEMBER

(All figures in l. tons)	Refined Copper			Lead†			Slab zinc			Tin metal		
	Nov. 1952	Jan.-Nov. 1952	Jan.-Nov. 1951	Nov. 1952	Jan.-Nov. 1952	Jan.-Nov. 1951	Nov. 1952	Jan.-Nov. 1952	Jan.-Nov. 1951	Nov. 1952	Jan.-Nov. 1952	Jan.-Nov. 1951
U.K. stocks beginning period	90,018	87,251	72,960	107,160	77,167	61,687	142,615	39,659	36,256	3,666	8,004	4,504
Imports	11,746	198,661	198,587	7,146	133,094	147,520	16,983	212,010	105,139	103	2,816	9,299
Production	14,545	143,044	118,664	6,322	79,830	67,811	5,458	60,616	63,907	2,176*	26,735*	23,310*
Consumption	26,040	325,904	303,990	19,896	177,247	216,616	12,790	159,230	171,649	1,826	20,721	22,172
Exports and Re-exports	46	582	793	12,248	27,341	—	7	137	28	680	21,414	5,554
U.K. stocks end period†	90,667	90,667	93,852	88,514	88,514	56,656	152,129	152,129	31,423	3,693	3,693	7,011

(Source : British Bureau of Non-Ferrous Metal Statistics)

*Estimated by International Tin Study Group. †Includes imported virgin lead and English refined from domestic ore and secondary metal. ‡Including any Government stocks other than strategic reserves. §In addition U.K. stocks of blister copper at the end of November were 35,727 tons ; of zinc concentrates were 58,085 tons ; and of tin in ore were 2,700 tons.

Paz last week to negotiate purchases with the Government), or elsewhere.

The U.K. has, so far, suffered no diminution of imports of Bolivian ore. According to the last Trade and Navigation returns, imports from Bolivia in 1952 amounted to 42,351 tons as compared with 37,152 in 1951, this increase in itself accounting for the whole of the year's increase in tin ore imports reported in the table on the next page. The Tin Study Group's figures showing imports of tin-in-ore into the U.K. are only available for the first eleven months of 1952 and give a tonnage for this period of 16,192 compared with 16,217 for the whole of 1951. These figures suggest, though not as yet conclusively, that this apparent increase in the Bolivian imports may to some extent have been off-set by a lowering of the grade.

The following are the tin in ore output figures up to November (where available) for the principal producers:—

Country	November 1952	Jan.-Nov., 1952	Jan.-Nov., 1951
Belgian Congo	1,141	12,170	11,710
Bolivia*†	3,918	29,032	27,783
Indonesia	3,114	31,827	28,044
Malaya	4,800	51,895	52,178
Nigeria	795	7,576	7,742
Thailand†	866	7,588	7,911

*Exports.

†Figures for October and cumulative totals up to October only.

ALUMINIUM.—Despite requests for a larger increase, Alcan, Reynolds and Kaiser have now apparently settled for the government's offer of half-a-cent per lb. on primary and ingot aluminium and four per cent. on fabricated aluminium products, in return for what is to be only a temporary discontinuance of their contract cancellation privileges coupled with the abandonment by the government of its own cancellation privileges, which provided that government contract purchases could be discontinued any time after half the total amount of metal specified in the contract had been delivered. The new ceiling prices are expected to become effective shortly, meanwhile the aluminium price in New York and Montreal is nominal.

CADMIUM.—The U.S. price has hardened further this week and is now back on a uniform level of \$2 per lb.

MANGANESE.—A \$67,500,000 loan to Brazil for developing new deposits of manganese ore and an eight and a half year Government purchase contract have been announced jointly by the U.S. Export-Import Bank and the D.M.P.A. This is by far the largest U.S. Government manganese purchase arrangement since the United States began its programme of stimulating "free world" production of critical materials. In 1951, the U.S. used 1,700,000 tons of manganese and consumption is believed to have been considerably higher last year. Over 90 per cent. of U.S. manganese requirements are imported. The recently announced agreement, which is with Industria e Comercio de Minerios, a Brazilian corporation partially owned by the Bethlehem Steel Company, specifies that a minimum of 70 per cent. of the 5,500,000 tons of ore to be produced from the mine must be exported to the United States, with large production scheduled to start in 1956. The U.S. Government will take a total of 400,000 tons in 1956 and 1957 for stockpiling and defence uses. If required for production, the ore would presumably be sold by the Government to private companies.

NICKEL.—The U.S. is seeking to ease its nickel shortage by the substitution of ferro-nickel for pure nickel in the production of stainless steel and certain other low alloy steels. To this end the D.M.P.A. has arranged for the Hanna Coal and Ore Corp. and the Hanna Nickel Smelting Co. (subsidiaries of the M. A. Hanna Company of Cleveland) to produce between 95,000,000 and 125,000,000 lb. of nickel from a large mountain deposit of nickel bearing ore in south western Oregon. This project will produce ingots of ferro-nickel under the Ugin process patented by a French company—the Societe d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electriques d'Ugine, which will receive a royalty for the use of the process.

QUICKSILVER.—Quicksilver eased slightly on the New York market last Tuesday and has since been quoted at around \$213-215 nominal per flask.

TITANIUM.—Speaking at the annual meeting of the Society of Automotive Engineers at Detroit last week, Mr. C. I. Bradford, director of operations of Rem-Cru Titanium Inc., emphasized that production of titanium could now be thought of in terms of tons rather than pounds. "During the past few years," he said, "the American industry-defence department team has performed an unprecedented job in giving birth to and establishing an entirely new titanium metal industry." Mr. Bradford cited the following main advances achieved by this metal during 1952:—

- (1) The industry is now producing two-ton ingots in place of ingots produced on a pound basis.
- (2) Up to five tons a day of metal are now being produced, and facilities for 20 tons a day are under construction.
- (3) Continuous wide strip processing is now a reality.
- (4) Reliable alloys are now available in almost all the standard forms in which stainless steel is produced.
- (5) Greater control of quality has been achieved.
- (6) Productive applications in aviation and other industries have been established.

Mr. Bradford added that "when titanium is reduced to the point where it is directly competitive cost-wise with other structural materials, the entire transportation and moving machinery fields, as well as others, will open up as potential markets."

GOLD.—U.K. imports of auriferous material last year showed a very great increase in value on those of 1951 which in its turn was more than three times the value in 1950. Last year's total reached £5,111,130 compared with £2,708,507 in 1951 and £841,033 in 1950, according to the Board of Trade returns.

U.K. Imports in 1952

The U.K. metal and mineral import figures we publish this week cover the whole of 1952 and corresponding figures for the preceding year are also given. The largest proportional increases have occurred in aluminium, which is up by nearly 55,000 tons, nickel which is up by 1,000 tons, iron and cupreous iron pyrites which is up by 160,000 tons and ilmenite which is up by about 25,000 tons. Among the more important decreases are the falling off in mercury imports by about 750,000 lb. and in bauxite by 63,000 tons. The apparent decrease in imports of tin metal of nearly 8,000 tons is misleading, in that the U.K. Government must have imported at least this amount to replace stockpile tin sold to the R.F.C. during the year, and whereas these latter sales appear in the Trade and Navigation returns as exports, the imports are technically stockpile purchases and therefore, in common with all U.K. stockpile imports, do not appear in published returns.

U.K. METAL & MINERAL IMPORTS—DECEMBER

	Units	Dec. 1952	Jan.-Dec. 1952	Jan.-Dec. 1951	Increase or decrease in 1952 over 1951
Non-ferrous metals and manufactures:					
Aluminium and alloys ..	Cwt.	324,908	4,739,905	3,545,342	+ 1,194,563
Bismuth*	Lb.	13,773	510,783	557,375	— 46,592
Cadmium	Lb.	13,409	1,390,798	1,489,426	— 98,628
Cobalt and Alloys	Lb.	113,794	3,362,445	3,482,535	— 120,090
Copper:					
Electrolytic	Tons	15,174	207,311	219,166	— 11,855
Other	Tons	14,036	175,402	136,463	+ 38,939
Lead	Tons	13,717	146,751	175,198	— 28,447
Mercury	Lb.	154,746	699,996	1,426,029	— 726,033
Nickel	Cwt.	13,057	133,336	112,352	+ 20,984
Tin	Tons	69	2,870	10,859	— 7,989
Zinc	Tons	17,171	228,847	121,879	+ 106,968
Ores and Concentrates:					
Antimony ore and conc.	Tons	210	17,831	25,745	— 7,914
Bauxite	Tons	32,962	282,265	345,647	— 63,382
Chromium ore	Tons	11,345	167,822	131,814	+ 36,008
Iron pyrites†	Tons	64,353	508,004	347,688	+ 160,316
Manganese ore	Tons	43,471	433,055	382,566	+ 50,489
Molybdenum ore	Tons	2,645	65,322	62,458	+ 2,864
Nickel ore, conc. & matte	Tons	2,471	33,835	34,260	— 425
Tin ore and conc.	Tons	4,727	55,130	50,616	+ 4,514
Titanium:					
Ilmenite	Tons	8,699	102,936	78,113	+ 24,823
Other sorts	Tons	312	8,900	9,282	— 382
Tungsten ore	Tons	802	8,313	4,749	+ 3,564
Zinc ore and conc.	Tons	11,498	193,755	180,191	+ 13,564
Non-metalliferous mining products:					
Asbestos	Tons	10,115	128,387	122,290	+ 6,097
Magnesite	Tons	834	21,601	22,969	— 1,368
Sulphur	Tons	6,313	403,596	377,314	+ 26,282

*Excluding bismuth alloys.

†Including cupreous iron pyrites.

Iron and Steel

Ample steel for all home requirements, a moderate increase in direct exports over the restricted levels of the past two years, and a reduction in the imports of high cost steel from overseas—these are the promises of the British steel industry for 1953.

The ingot output last year (over 53 weeks) which totalled 16,418,000 tons compared with 15,640,000 tons in 1951 was primarily due to the completion of most of the projects in the industry's 1946 development plan. Blast furnace capacity was increased by over a million tons and as the full benefit of the new furnace is felt this year pig iron production is expected to advance by another million tons this year. But the confidence expressed by the steel makers in their ability to turn out 17,500,000 tons of steel in 1953 is based not only upon the expansion of capacity. In 1951 the reduced level of steel production was only obtained at the expense of a reduction in the industry's stocks of steel making pig iron and scrap. More recently these stocks have been replenished. The tonnages in hand are at the highest level for over two years and there are substantial assurances that ample supplies of raw materials will be available to sustain the full-scale activity of the steel plants. Even scrap supplies are more plentiful and an extra 3,000,000 tons of home and foreign ore have been provided during the past twelve months.

The estimate of an increase of 2,000,000 tons in the available supplies of steel this year, brings within sight the restoration of an early balance between supply and demand. It is, however, premature to discuss the abolition of the rationing system, ardently though this may be desired. Producers are delivering material as quickly as they can but there are heavy back logs still to be overtaken and they are chary of taking on additional commitments. It is believed that a few months must elapse before these arrears are overtaken. In the meantime more activity is developing in the export trade and the competition level of British prices encourages the hope that shipments which totalled 2,600,000 tons last year, may be increased to about 3,250,000 tons in the year ahead.

The London Metal Market

(From Our Metal Exchange Correspondent)

The demand for nearby tin has been maintained, and this has resulted in a further widening of the backwardation which in turn has brought about a firm undertone. Earlier in the week the R.F.C. announced that they had purchased a further tonnage of Bolivian tin concentrates, and this should cover the mine's output of October, November and December. The purchase was on the same basis as those made previously, namely, 117½ c. per lb. f.o.b. South American port, but the maintenance of this price should not be taken to indicate that a long-term contract could be fixed on the same basis. It is hoped, however, that the representatives of the U.K. smelter who are at present in Bolivia will be able to fix up a long-term contract for the shipment of ores to this country. The Eastern price on Thursday morning was equivalent to £954 per ton c.i.f. Europe.

The lead market has again been quiet but a firmer trend has developed, and with the prospect that the strike at Port Pirie may continue, this may last for some time. In spite of the fact that there has been more metal on offer for January settlement than has been the case for some time, the backwardation has remained fairly constant owing to better consumer interest. In assessing the position it should not be overlooked that January settlement lead was dealt in when the market reopened on October 1, and that a full cycle of the Exchange's operations will not be completed until after the end of this month; any continuance of the backwardation after that will be due almost entirely to fears as to the supply position on account of the Australian strike, and when this is settled level quotations should be established prior to a

contango developing when stocks of metal have to be financed by merchants and dealers.

The zinc market has again fluctuated considerably but with a very reduced turnover, and there are signs that the recession is temporarily at an end, although it cannot be said that consumers are showing any more interest.

Copper is still in brisk demand in America, but sellers in Europe are finding it more difficult to dispose of their metal at previous prices. It now seems certain that the suspension of the U.S. import duty will be continued until June 30, 1955.

Closing prices and turnover for the week are given in the following table:

	January 15		January 22	
	Buyers	Sellers	Buyers	Sellers
Tin				
Cash	£956	£957	£963	£965
Three months	£942	£943	£943	£944
Settlement	£957		£964	
Week's turnover	315 tons		205 tons	
Lead				
Current month	£97	£98	£100	£100 10s.
Three months	£94-5	£94-10	£97 5s.	£97 15s.
Week's turnover	4,100 tons		5,100 tons	
Zinc				
Current month	£88	£88-10	£88	£88 10s.
Three months	£88	£88-10	£88 5s.	£88 10s.
Week's turnover	3,600 tons		2,950 tons	

JANUARY 22 PRICES

COPPER

Electrolytic £285 0 0 d/d

TIN, LEAD AND ZINC

(See our London Metal Exchange report for Thursday's prices)

ANTIMONY

English (99%) delivered,
10 cwt. and over £225 per ton
Crude (70%) £210 per ton
Ore (60% basis) 20s. — 22s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) £483 per ton

OTHER METALS

Aluminium, £166 per ton
Bismuth (5 cwt. lots) 17s. 6d. lb.
(min. 2 cwt. ex-warehouse)
Cadmium (Empire), 14s. 4d. lb.
Chromium, 6s. 5d./7s. 6d. lb.
Cobalt, 20s. lb.
Gold, 248s. f.o.z.
Iridium, £60 oz. nom.
Magnesium, 2s. 10½d. lb.
Manganese Metal (96%-98%)
2s. 2d./2s. 3d. per lb. d/d
Osmiridium, £40 oz. nom.
Osmium, £65/£70 oz. nom.
Palladium, £7 15s./£8 10s. oz.
Platinum, £27/£33 5s.
Rhodium, £42 10s. oz.
Ruthenium, £25 oz.
Quicksilver, £70 10s./£71
ex-warehouse
Selenium, 30s./30s. 6d. nom.
per lb.
Silver 74d. f.o.z. spot and f'd.
Tellurium, 18s./19s. lb.

ORES, ALLOYS, ETC.

Bismuth 30% 4s. 6d. lb. c.i.f.
20% 2s. 6d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (lumpy) £13 2s. per ton c.i.f.
" " (concentrates) £13 2s. per ton c.i.f.
" " Refractory £12 14s. per ton c.i.f.
Baluchistan Metallurgical .. £14 15s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26 - £27 d/d
Magnesite, Raw .. £10 - £11 d/d
Molybdenite (85% basis) .. 105s. 10d. per unit c.i.f.
Wolfram (65%) .. 370s. c.i.f. U.K. buying
" .. 392s. 6d. Selling
Scheelite .. 360s. c.i.f. U.K. buying
" .. 382s. 6d. Selling
Tungsten Metal Powder .. 30s. 8d. nom. per lb. (home)
(for steel manufacture)
Ferro-tungsten .. 25/3-25/9 nom. per lb. (home)
Carbide, 4-cwt. lots .. £32 3s. 9d. d/d per ton
Ferro-manganese, home .. £48 12s. 11d. per ton
Manganese Ore U.K.
(48% - 50%) .. 6s. per unit
Brass Wire .. 2s. 8½d. per lb. basis
Brass Tubes, solid drawn .. 2s. 2½d. per lb. basis

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COMPANY NEWS AND VIEWS

Gold Coast Selection Trust Widens Its Investment Portfolio

At last year's annual general meeting of Gold Coast Selection Trust the chairman, Major General W. W. Richards, said in his review to shareholders that although the scope for future activities in the Colony was by no means exhausted, the directors had decided to widen the field of the Trust's interests. No mention was made at that time as to what other "fields" were being borne in mind for future investment, but the report and accounts now issued covering operations for the year to September 30 last reveals that the Trust's portfolio has been broadened by the acquisition of holdings in Nigerian tin and columbite mines, Beralit Tin and Wolfram, F.S. Geduld, Stilfontein, Coronation Syndicate, and a few Industrials.

No indication is given in the accounts of the amount of dividend income received during the year from the new acquisitions but taking as a guide the results appearing in the profit and loss account for the year to September 30 last it would appear that the board's policy of broadening the basis on which the Trust's fortunes depend has been successful. Income from dividends and interest increased by approximately £24,000 to £110,630, and although profit from share dealing operations declined to £2,357 (£19,449), the period covered by the accounts was not conducive to profitable transactions.

Year to June 30	Gross Revenue	Expenses	Tax	Net Profit	Divi- dend	Carry forward
	£	£	£	£	%	£
1952	112,987	20,283	9,187	83,517	12½	52,376*
1951	107,077	8,341	10,753	87,983	12½	48,078

*After allocating £30,000 to investment reserve.

The balance sheet showed a further decline in the market value of the Company's investment to £1,229,858 (£1,465,093), though this is still above the total book cost, recorded at £1,201,317. In view of the fall in the market value of the investment portfolio, an allocation of £30,000 (nil) was made to the investment reserve account which at September 30 last stood at £90,585.

Prospects for the current year appear brighter than for some time past. There is a growing confidence in the political stability of the Gold Coast, and this, coupled with the excellent results published recently by some of the Colony's producers, has brought about a long overdue revival of activity in the market for "West Africans." Moreover, the free market price is still providing a useful source of additional revenue to help offset working costs. Thus there are sound grounds for hoping that the market value of the Trust's holdings in the current year will show a marked increase over the figure given in the latest balance sheet.

United Tin Areas

Although the working profit of United Tin Areas of Nigeria for the year to June 30 last is given in a preliminary statement at nearly £3,000 less than in the preceding year, the company is

raising its dividend by 2 per cent. which has necessitated dipping into its forward balance.

Year to June 30	Output (tons)	Working Profit	Tax	Net Profit	Divi- dend	Carry Forward
		£	£	£	%	£
1952	101	20,191	13,816	6,375	12	10,422
1951	96	23,087	13,535	9,552	10	13,497

United Tin Areas is one of the companies interested in Mines Development Syndicate (West Africa) whose lead/zinc properties in Nigeria, the American Smelting and Refining Co., were, until recently, carrying out exploration work with a view to establishing a lead/zinc operation. Despite the Nigerian Government granting favourable lease terms, A.S. and R. recently announced that it had decided to discontinue its activities—although the existence of payable ore bodies had been established. This announcement came as a surprise to the market and in the absence of a further statement from American Smelting or from Mines Department Syndicate in the near future, it is to be hoped that Mr. A. H. Williams, chairman of United Tin Areas, at the annual general meeting called for February 26 next will throw some light on the situation.

United Tin has a substantial stake in Esperanza Copper and Sulphur which, according to recent progress reports, is making good headway and should prove to be a profitable source of revenue in the future.

Indians Complete Their Financial Year

Since the December returns from the four Kolar Gold Field companies complete their current financial year, the cumulative totals to date and the corresponding figures for the preceding year are of particular significance.

Company	December 1952		Months since year end	Current Financial Year		Last Financial Year	
	Tons (000)	Yield (oz.)		Total to date Tons (000)	Yield (oz.)	Total to Date Tons (000)	Yield (oz.)
Champion Reef	8	3,912	12	149	66,477	170	70,652
Mysore	16	6,661	12	206	74,729	185	60,073
Nundydroog*	19	6,396	12	261	67,742	231	54,693
Ooregum	11	2,710	12	126	35,862	121	31,088

* includes tailings.

Of the four producers, only Champion Reef failed to better its 1951 year-end totals. Mysore and Nundydroog showed the largest advances in tonnage crushed and in gold production, although Ooregum recovered approximately 4,800 oz. more from an additional 5,000 tons. This is a remarkable increase for taken at the margin it indicates a recovery of not far short of 20 dwt. per ton for the extra tonnage sent through the mill. In view of the chairman's remarks at the last annual meeting this result is even more unexpected as at that time he considered it was doubtful whether Nundydroog would avoid making a loss.

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Actually, this might still be the case, for without any indication in the monthly returns concerning profits it is impossible to assess the real value of the results. Kolar Gold Field costs are high and this factor, together with the severe fall in the price of gold on the Bombay market, may well confirm the chairman's statement that dividends in respect of 1952, where paid, would be meagre.

Taxation of Uranium Industry Criticised

The method of taxing the uranium industry in the Union of South Africa is "inequitable and manifestly needs reconsideration" according to Mr. C. S. McLean, President of the Transvaal Chamber of Mines.

Speaking at Virginia, in the Orange Free State, on July 14 last Mr. McLean said that the fact that uranium production from residue or gold-bearing ores in the Orange Free State would begin before gold mines reached their full gold production tended to emphasize how inequitable the method of taxing the uranium industry was. "Here is an industry of great potential importance to South Africa yet, before its operations have reached the production stage, the State has applied to it the same inequitable differential taxation as that imposed on gold mines."

For many years, gold mines had protested to succeeding governments that differential taxation of them was inequitable and justifiable only on the grounds of expediency. Despite these protests the State's fiscal policy remained unchanged. "I can but repeat that the application of this scale of taxation to the new uranium industry manifestly needs reconsideration."

Company Shorts

Proposed Merger Between Middle Wits and American Anglo-Transvaal.—Particulars were published towards the end of last week of a proposed merger of two companies in the Anglo-Transvaal Consolidated Investment Group. The two companies concerned are the Middle Witwatersrand (Western Arcas) and American Anglo-Transvaal Investment Corporation. The proposals to be put before shareholders of both companies at meetings called for February 6 in Johannesburg are that Middle Wits acquire the assets and liabilities of American Anglo-Transvaal, and that this arrangement be satisfied by shareholders in American Anglo-Transvaal receiving one Middle Wits share of 2s. 6d. for every three fully-paid shares or twelve partly-paid shares in American Anglo-Transvaal.

The foregoing arrangement will affect the management agreement, due to expire in October, between American Anglo-Transvaal and Anglovaal which provided that the two companies should offer each other a 33½ per cent. participation in all ventures in which they actively enter into. It is now proposed to terminate this agreement and in its stead Anglovaal will offer Middle Wits a 20 per cent. participation in all new business for a period of five years from October 15 next.

Burmese Army Drives to Free Mawchi.—The Mawchi Mines, which before the war produced about 10 per cent. of the world's demand for wolfram, may soon be liberated if a Burmese army offensive, now under way, against the Karen rebels is successful.

According to a Reuter's report, the Burmese army has opened a concentrated offensive to liberate the British-owned Mawchi wolfram mines, some 270 miles north-east of Rangoon. A bitter battle is, however, expected to be fought at Mawchi which is well defended by the Karen rebels, who have been smuggling the mines' stockpiles of wolfram to Thailand, where prices offered have been very much above the current market price.

Further agency messages received under date January 21, from Rangoon, report that forward columns of the Burmese Army were within 20 miles of the mines, and that an entire rebel Karen battalion guarding strategic points between Toungoo and Mawchi had surrendered to the government forces.

The development of Mawchi and other wolfram mines was among the new development plans recently drawn up by the Burmese Government and the latest operations are intended to clear the area of rebels in order to put the government's schemes into effect. The administrative bodies which will be responsible for the implementation of the new development programme will be an Industrial Development Corporation and a Mineral Resources Development Corporation. Burma's Minister of Finance, Mr. U. Tin, will be chairman of the Mineral Resources Development Corporation.



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Mining Men and Matters

Mr. R. Ellerton Binns has been appointed chairman of Temoh Tin Dredging.

Mr. C. C. Gover has been appointed chairman of Tilbury Contracting and Dredging in succession to **Mr. W. J. Keswick** who relinquished his office as chairman, following his recent appointment as Governor of the Hudson's Bay Company.

Professor Willis Jackson has accepted the full time appointment of director of Research and Education of Metropolitan-Vickers Electrical Co. as from July 1. The appointment carries with it a seat on the board of the company.

Mr. G. D. Harradine has been appointed sales manager, Industrial Control Department of Metropolitan-Vickers Electrical Co., in succession to **Mr. C. H. de Nordwall**, who has been appointed manager for South America of Metropolitan-Vickers Electrical Export Co.

Mr. Dudley Thomas Lewis has been appointed a director of Temoh Tin Dredging.

Mr. Hugh Vivian Smith has retired from the boards of several companies incorporated in South Africa on his return to take up residence in England. He will, however, remain on the board of Anglo-American Corporation of South Africa, but ceases to be its managing director.

Professor I. C. F. Statham Awarded Douglas Hay Medal.—The 1951-1952 award of the Institution of Mining Engineers' Douglas Hay Medal, instituted in 1950 to perpetuate the name of the late Professor Douglas Hay, past-president of the I.M.E., has been made to Professor I. C. F. Statham, Sheffield University, in recognition of his valuable services to the mining industry and to mining engineers in many fields, and in particular for his original work on flameproof enclosures, mine ventilation, mine gases and explosions, mining education and training and for his many contributions to the literature on these subjects.

The Institution of Mining Engineers will hold its annual general meeting at the Connaught Rooms, Great Queen Street, London, W.C.2, on Thursday January 29, at 11.15 a.m.

Robert Hudson Ltd., on December 1 last, moved their London office to 47 Victoria Street, London, S.W.1. The new telephone number is ABBey 7127, and the telegraphic address is "Raletrux Sowest."

APEX (TRINIDAD) OILFIELDS

The Thirty-third Annual General Meeting of Apex (Trinidad) Oilfields, Limited, was held in London on Wednesday last.

Mr. Malcolm MacLachlan (Chairman) who presided in the course of his speech said:

After providing £1,055,000 for taxation in Trinidad and the United Kingdom, the net profit for the year was £547,000.

The Directors recommended the payment of a final dividend of 1s. 9d. free of income tax, making a total dividend for the year of 2s. 3d., free of income tax. The unappropriated profit to be carried forward would amount to £234,000.

Capital and reserves now totalled £4,064,000, and current assets at £4,861,000 exceeded current liabilities and future taxation by £2,797,000.

The production for the year amounted to 3,136,000 barrels of crude oil and 4,039,000 gallons of casing head gasoline.

During the year 68,557 ft. had been drilled in continuance of the programme to obtain production and to extend the tested areas of the property.

Five wells were completed in the Main Field and four in the South Quarry area.

The price the Company received for its oil and casing head gasoline which was on a basis related to United States prices showed some decline during the second half of the year, though this was partially offset by a slight rise in the dollar exchange.

Working costs had again shown a sharp increase which was likely to be accentuated during the current year due principally to the very material wage increases recently granted and to the fact that drilling at depth was likely to be operative throughout the year. Although there had been no appreciable change in the scale of its operations, the Company's costs for the year under review were 34 times those of 1938/39.

The division of the results for the year continued to illustrate the benefit derived from the success of the enterprise by the government and people of Trinidad. For every £1 drawn by the owners of the business approximately £4 17s. 9d. was taken by the Trinidad and United Kingdom governments.

The report and accounts were adopted.

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JOHANNESBURG CONSOLIDATED INVESTMENT CO., LTD.

(Incorporated in the Union of South Africa)

MINING COMPANIES' REPORTS FOR QUARTER ENDED 31st DECEMBER, 1952

GENERAL REMARKS.—The revenue from gold has been calculated on the basis of gold at 249s. 3d. per ounce fine for October, 248s. 3d. for November, and 248s. for December, 1952. In determining the payable development footage gold has been taken at 248s. 3d. per ounce fine. The development figures are the actual results of the sampling of development work on reef; no allowance has been made for modifications which may be necessary when computing the ore reserves.

10 and 11, Austin Friars, London, E.C.2. 21st January, 1953.

The East Champ D'Or Gold Mining Company, Limited
(Incorporated in the Union of South Africa)

ISSUED CAPITAL.....£259,875
Crushed 81,000 tons; yielding 13,401 ounces fine gold

	£	Per ton crushed s. d.	Per oz. fine gold produced s. d.
Revenue from Gold.....	166,510	41 1	
Working Costs.....	142,940	35 3	213 4
Sundry Revenue.....	23,570	5 10	
Profit for Quarter.....	24,446		

In addition to the above, £3,084 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.
Taxation for the quarter is estimated at £8,841.
The expenditure on Capital Account amounted to £400.

DIVIDEND No. 32 of 12½ per cent. (3½d. per 2s. 6d. share) has been declared in Union of South Africa currency, payable to shareholders registered at 31st December, 1952.

The **DEVELOPMENT FOOTAGE** sampled totalled 2,990 feet, and gave the following results: **PAYABLE**, 1,560 feet, having an average value of 5.9 dwts. over 34 inches. **UNPAYABLE**, 1,430 feet, having an average value of 2.0 dwts. over 39 inches.

The **ORE RESERVES** at the end of the year were estimated to amount to 229,000 tons, with an average value of 3.3 dwts. over a stopping width of 48 inches.

Government Gold Mining Areas (Modderfontein) Consolidated Limited
(Incorporated in the Union of South Africa)

ISSUED CAPITAL.....£1,400,000
Crushed 750,000 tons; yielding 98,917 ounces fine gold

	£	Per ton crushed s. d.	Per oz. fine gold produced s. d.
Revenue from Gold.....	1,229,055	32 9	
Working Costs.....	1,076,990	28 9	217 9
Sundry Revenue.....	152,065	4 0	
Profit for Quarter.....	175,214		

In addition to the above, £25,174 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.

The Government's share of profits for the quarter is estimated at £36,437.

DIVIDEND No. 71 of 20 per cent. (1s. per 5s. share) has been declared in Union of South Africa currency, payable to shareholders registered at 31st December, 1952.

The **DEVELOPMENT FOOTAGE** sampled totalled 7,660 feet, and gave the following results: **PAYABLE**, 4,065 feet, having an average value of 4.4 dwts. over 46 inches. **UNPAYABLE**, 3,595 feet, having an average value of 1.9 dwts. over 52 inches.

The **ORE RESERVES** at the end of the year were estimated to amount to 7,528,000 tons, with an average value of 2.9 dwts. over a stopping width of 58 inches.

New State Areas, Limited
(Incorporated in the Union of South Africa)

ISSUED CAPITAL.....£1,514,037
Crushed 135,000 tons; yielding 18,202 ounces fine gold

	£	Per ton crushed s. d.	Per oz. fine gold produced s. d.
Revenue from Gold.....	226,156	33 6	
Working Costs.....	227,144	33 8	249 7
Sundry Revenue.....	988	0 2	
Profit for Quarter.....	4,096		
	3,108		

In addition to the above, £4,576 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.
(Note: There was no liability in respect of Government's share of profits or taxation for the quarter.)

DIVIDEND No. 56 of 14 per cent. (3d. per £1 share) has been declared in Union of South Africa currency, payable to shareholders registered at 31st December, 1952.

The **DEVELOPMENT FOOTAGE** sampled totalled 1,370 feet, and gave the following results: **PAYABLE**, 396 feet, having an average value of 28.7 dwts. over 11 inches. **UNPAYABLE**, 974 feet, having an average value of 5.0 dwts. over 15 inches.

The **ORE RESERVES** at the end of the year were estimated to amount to 81,000 tons, with an average value of 4.8 dwts. over a stopping width of 41 inches.

The Randfontein Estates Gold Mining Company, Witwatersrand, Limited
(Incorporated in the Union of South Africa)

ISSUED CAPITAL.....£4,063,553
Crushed 967,000 tons; yielding 120,443 ounces fine gold

	£	Per ton crushed s. d.	Per oz. fine gold produced s. d.
Revenue from Gold.....	1,496,569	30 11	
Working Costs.....	1,423,858	29 5	236 5
Sundry Revenue.....	72,711	1 6	
Profit for Quarter.....	17,595		
	90,306		

In addition to the above, £29,171 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.

Taxation for the quarter is estimated at £190.

The expenditure on Capital Account amounted to £5,720.

URANIUM PRODUCTION

At the Extraordinary General Meeting of Shareholders held on 14th October 1952, the borrowing powers of the Directors were increased up to the amount of the issued capital of the Company in order to enable the Directors to raise loans to meet expenditure in connection with the Uranium Project.

Expenditure for the quarter in this connection amounted to £243,580, which sum was met from Loan Funds.

DIVIDEND No. 45 of 5 per cent. (1s. per £1 share) has been declared in Union of South Africa currency, payable to shareholders registered at 31st December, 1952.

The **DEVELOPMENT FOOTAGE** sampled totalled 8,440 feet, and gave the following results: **PAYABLE**, 3,820 feet, having an average value of 7.7 dwts. over 40 inches. **UNPAYABLE**, 4,620 feet, having an average value of 1.6 dwts. over 51 inches.

The **ORE RESERVES** at the end of the year were estimated to amount to 3,580,000 tons, with an average value of 3.0 dwts. over a stopping width of 51 inches.

UNION FREE STATE COAL & GOLD MINES LTD.

(IN LIQUIDATION)

(Incorporated in the Union of South Africa)

At a meeting of the Liquidators held immediately after the Extraordinary General Meeting of Shareholders on January 14, 1953, when the Company was placed in voluntary liquidation, it was decided to distribute on a pro rata basis as a first liquidation distribution 2 Harmony shares for every 5 shares held in this Company. This will absorb 2,950,980 of the 3,092,206 shares in Harmony Gold Mining Company Limited registered in the name of the Company.

It is anticipated that the Transfer Books and Register of Members will remain open until some time in March and that the necessary formalities in connection with the first distribution account will then be completed within the next month or so. Thereafter the Harmony shares will be distributed as soon as possible. Shareholders will be advised in due course of the date of the final closure of the Transfer Books and Register of Members.

A. MOIR & Co.

London Agents of the Liquidators.

4 London Wall Buildings, E.C.2.

January 15, 1953.

DIVIDENDS

Anglo American Corporation of South Africa 3% (Feb. 5)
African & European Investment 6% Cum. Pref. 3% (Feb. 17)
Apex Mines 30% (Feb. 5)
Beralit Tin & Wolfram 80%
British Tin Investment 13%
Cons. Main Reef Mines 2s. 3d. (Feb. 5)
Cons. Diam'd Mines of S.W. Africa Pref. 3½% Ord. 10s. (Feb. 17)
Coronation Syndicate 12½% (Feb. 10)
City Deep 1s. (Feb. 5)
Goodyear Tyre & Rubber 15% i *
Gt. Boulder Proprietary 6d. i (March 11)
Head, Wrightson 5% i
London & Rhodesian Mining & Land 6% i (March 3)
Malayan Tin Dredging 1s. 6d. i
Miami Copper 75c.
Modderfontein East 1s. 6d. (Feb. 5)
Murex 6% i
Nchanga Cons. Copper Mines 5s. i (Feb. 11)
New Kleinfontein Co. 1s. 6d. (Feb. 5)
Powell Duffryn Ord. 3% i (Feb. 24)
Rhodesia Broken Hill Development 9d. i (Feb. 11)
Rooiberg Minerals 37½% i (Feb. 5)
Singkep 2% i
Southern Malayan Tin Dredging 1s. 6d. i
Transvaal Cons. Land and Exploration 1s. 9d. (Feb. 5)
Transvaal Gold Mining Estates 9d. (Feb. 5)
Vereeniging Brick & Tile 7½d. (Feb. 16)
Westminster Bank £4 shares 9%; £1 shares 6½%
West Wit. Areas 30% i
i interim * tax free

ANGLO-TRANVAAL CONSOLIDATED INVESTMENT CO. LIMITED

Mining Companies' Directors' Reports for Quarter Ended 31st December, 1952

Following are the reports on work done during the quarter ended 31st December, 1952

ANGLO-TRANVAAL COLLIERIES, LIMITED

The Sales Output of the Subsidiary Collieries controlled by this Company for the quarter ended 31st December, 1952, totalled 265,238 tons.

EASTERN TRANVAAL CONSOLIDATED MINES, LIMITED

The total tonnage treated during the quarter ended 31st December, 1952, by the four gold mines operated by this Company amounted to 55,055 tons, resulting in a Working Profit (including Sundry Revenue) of £50,237 for the quarter.

Revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the three months October to December, 1952, inclusive, amounted to £4,354, making a total profit for the quarter of £54,591.

The Profit, as shown above, does not take into consideration the amount, estimated at £18,000 for the quarter, payable to the Government in Mining Taxation.

Capital Expenditure during the quarter amounted to £37,630.

SHAFT SINKING AND EQUIPMENT

SHEBA MINE—Progress was made with preparations for the deepening of the Zwartkopje Vertical Shaft.

GENERAL—A total of 370 feet of development from the Ben Lomond Tunnel was accomplished during the quarter, bringing the advance in connection with this work to a total of 4,897 feet.

Progress was made with work in connection with the extension of the New Consort Power Station.

MERRIESPRUIT (ORANGE FREE STATE) GOLD MINING COMPANY, LIMITED

SHAFT SINKING

No. 1 VERTICAL SHAFT was sunk 309 feet in quartzites of the Upper Witwatersrand System to a total depth of 3,633 feet. In addition, 62,134 cubic feet were excavated in the cutting of the third station at a depth of 3,510 feet, in the cutting of the brow-box to serve this station, and in the stoping out of the Basal Reef for a distance of 10 feet beyond the circumference of the Shaft.

The Shaft was concrete lined to a depth of 3,625 feet, of which 341 feet were accomplished during the quarter. The intersection in pilot holes of water-bearing fissures, requiring cementation, considerably delayed sinking operations.

REEF INTERSECTION—The Basal Reef was intersected at a depth of 3,562 feet below the collar and a full exposure of the reef over the periphery of the Shaft was completed at a depth of 3,581 feet below the collar.

The reef was sampled at 5 feet intervals around the periphery of the Shaft and 16 sections sampled gave an average value of 5.97 dwts., over a channel width of 52.8 inches, equivalent to 315 inch-dwts.

Minor faulting in the southern portion of the Shaft caused a partial duplication of reef in two of the 16 sections sampled and the additional reef exposure has not been included in the above average.

To facilitate the removal of the Shaft Pillar at a later date, the Basal Reef was stoped out for a distance of 10 feet beyond the circumference of the Shaft and 28 sections sampled at 5 feet intervals around the stoped-out area, gave an average value of 7.03 dwts., over a channel width of 41.8 inches, equivalent to 294 inch-dwts.

The Leader Reef, which was intersected between shaft depths of 3,470 feet and 3,510 feet averaged 0.5 dwt., over a channel width of 255.6 inches for 18 sections sampled.

SHAFT EQUIPMENT AT No. 1 SHAFT—Work was commenced on the erection of the 4,400 H.P. Permanent Electric Winder. Work on the erection of the Service Winder was stopped during the quarter and will be resumed when the permanent shaft equipment has been installed.

POWER SUPPLY—The construction of an overhead power line from Virginia to Merriespruit has been commenced by the Electricity Supply Commission.

LABOUR—The Labour Strength at the end of the quarter was :—Europeans, 56 ; Natives, 426.

CAPITAL EXPENDITURE—Capital Expenditure amounting to £137,429 was incurred during the quarter on shaft sinking, buildings and plant.

The total Capital Expenditure, including preliminary expenses, incurred to 31st December, 1952, amounted to £2,321,768.

MIDDLE WITWATERSRAND (WESTERN AREAS), LIMITED

The Company retains its interests in Mineral Rights in the Virginia and Odendaalsrus Districts of the Orange Free State and in the Klerksdorp District of the Transvaal, and in a Mineral Option Contract over the farm Britzpan No. 1289 in the Odendaalsrus District of the Orange Free State.

Mineral Option Contracts over approximately 600 morgen in the Winburg District of the Orange Free State and over approximately 1,186 morgen in the Klerksdorp District of the Transvaal were abandoned during the quarter.

AMERICAN ANGLO-TRANVAAL INVESTMENT CORPORATION LIMITED.

Attention is drawn to the recently published circular and notice to shareholders convening an Extraordinary General Meeting of your Company to be held on 6th February, 1953, for the purpose of confirming the conditional agreement with American Anglo-Transvaal Investment Corporation Limited for the acquisition of that Company's assets and the assumption of its liabilities.

DRILLING OPERATIONS

During the quarter a total of 4,308 feet was drilled in 6 boreholes.

Bore-hole No.	Drilled on joint account with	Farm	Depth at December 31, 1952 Ft.	Formations traversed during Quarter		Reefs intersected					Remarks	
				Borehole Depths (ft.)		Description	Reef	Depth ft.	Value dwt.	Cor-rected width in.		In.-dwt.
				From	To							
VDH. 6/51	General Exploration Orange Free State, Limited	Vanden Heeverstrust No. 419, District Odendaalsrus	6,466 Original borehole completed on February 18, 1952 Deflections in progress								*	Progress delayed by the intersection of fissured
TL. 30/52		Klerksdorp Townlands No. 44 District Klerksdorp	6,947 Original borehole completed on July 24, 1952 Deflections completed on October 13, 1952				Uncorrelated Uncorrelated	6,610 6,610	0.67 0.93	17.8 21.9	12 20	2nd Deflection 3rd Deflection
TL. 35/52		Klerksdorp Townlands No. 44, District Klerksdorp	5,144 Original borehole completed on July 22, 1952 Deflections completed on November 7, 1952				Uncorrelated Uncorrelated	4,839 4,844	4.51 2.4	13.6 29.9	61 63	4th Deflection 4th Deflection

Borehole No.	Drilled on joint account with	Farm	Depth at December 31, 1952 Ft.	Formations traversed during Quarter		Reefs intersected					Remarks	
				Borehole Depths (ft.)		Description	Reef	Depth ft.	Value dwt.	Corrected width in.		In.-dwt.
				From	To							
TL. 36/52		Klerksdorp Townlands No. 44, District Klerksdorp	6,480 Original borehole completed on September 26, 1952 Deflections completed on December 11, 1952				Vaal Vaal	6,129	3.1	10.7	33	Original intersection. Now correlated as Vaal Reef. Core recovery incomplete 1st Deflection. Core recovery nearly complete 2nd Deflection. Core recovery incomplete 3rd Deflection. Core recovery nearly complete 4th Deflection. Core recovery complete
							Vaal	6,129	14.3	8.5	122	
							Vaal	6,128	37.9	5.4	205	
							Vaal	6,128	40.6	5.6	227	
							Vaal	6,128	18.9	5.6	106	
TL. 37		Klerksdorp Townlands No. 44, District Klerksdorp	456 In progress	0	456	Ventersdorp Lava						
TL. 40		Klerksdorp Townlands No. 44, District Klerksdorp	2,011 In progress	0 35 100	35 100 2,011	Overburden Black Reef Series Ventersdorp Lava						

In addition, the Company is participating in the drilling of the following boreholes in the Orange Free State :—

Borehole Number	Farm	Drilled by
ERK.1	Energie No. 896, District Odendaalsrus	Free State Development and Investment Corporation, Limited
BH.2 (RD.2)	Rosedale No. 898, District Odendaalsrus	General Exploration, Orange Free State, Limited
BH.3 (SB.3)	Spes Bona No. 921, District Odendaalsrus	General Exploration, Orange Free State, Limited

NEW KLERKSDORP GOLD ESTATES, LIMITED

PRODUCTION

Tons milled—34,200 yielding 4,203.31 ounces fine of gold.	
Revenue from Gold	£52,227
Working Costs	£49,527
	£2,655
Sundry Revenue	£425
Working Profit for Quarter	£3,080
Working Costs per ton milled	29s. 0d.
Working Costs per fine ounce recovered	235s. 11d.

In addition to the above Revenue, £699 accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the Quarter.

The Working Profit for the Quarter, as shown above, does not take into consideration interest on loan amounting to £1,507 for the Quarter.

No liability was incurred for Mining Taxation payable to the Government in respect of the profits earned for the Quarter.

CAPITAL EXPENDITURE

No Capital Expenditure was incurred during the Quarter.

DEVELOPMENT

The total footage advanced during the Quarter amounted to 2,075 feet. Of 1,480 feet sampled, 70 feet, equal to 4.7 per cent., were classed as payable at an average value of 3.14 dwts., over a channel width of 41 inches, equivalent to 129 inch-dwts. (The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

ORE RESERVE

The Payable Ore Reserve as at 31st December, 1952, was estimated to amount to 193,000 tons, having an average value of 2.46 dwts., over a stoping width of 60.8 inches.

Included in the above Ore Reserve is 169,000 tons on Commonage Reef, having an average value of 2.49 dwts., over a stoping width of 49.6 inches. (In the compilation of the above Ore Reserve, the Pay Limit was based on a gold price of £12 8s. 3d. per ounce fine and anticipated Working Costs.)

RAND LEASES (VOGELSTRUISFONTEIN) GOLD MINING COMPANY, LIMITED

PRODUCTION

Tons crushed : 524,500 yielding 88,013 ounces fine of gold		Per ton crushed
Revenue from Gold	£1,093,628	41s. 8d.
Working Costs	£970,319	37s. 0d. (220s. 6d. per ounce fine)
	£123,309	4s. 8d.
Sundry Revenue	£12,500	6d.
Working Profit for Quarter	£135,809	5s. 2d.

Working Costs per ton, 37s. 0d., include 6s. 0d. in respect of development expenditure.

In addition to the above Revenue, £15,432 accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the quarter.

The Working Profit for the quarter, as shown above, does not take into consideration the amount, estimated at £24,000 for the quarter, payable to the Government in Taxation and as its share of the profits in terms of the Mining Lease.

CAPITAL EXPENDITURE

The expenditure on Capital Account during the quarter amounted to £46,540.

SHAFT SINKING

KIMBERLEY REEF No. 2 INCLINE SHAFT was advanced 30 feet to a total length of 1,401 feet.

DEVELOPMENT

A total of 19,127 feet of shaft sinking and development was accomplished during the quarter, of which 9,580 feet were sampled, showing 5.365 feet, equal to 56 per cent., as payable. Payable reef disclosures were distributed as follows :—

Reef	Footage Sampled	Payable				
		Ft.	Percentage	Channel Width (in.)	Channel Value (dwt.)	In.-dwt.
Main Reef	2,870	1,350	47	31.8	7.57	240
Main Reef Leader	3,410	2,160	63	9.2	25.52	236
South Reef	1,490	965	65	10.8	20.75	224
Total Main Reef Series	7,770	4,475	58	16.4	14.34	235
Bird Reef	540	400	74	48.5	5.31	257
Kimberley Reef	1,270	490	38	56.9	4.62	263
Totals and Averages	9,580	5,365	56	22.5	10.64	239

(The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

DIVIDEND

A Dividend (No. 33) of 10 per cent. (1s. 0d. per Share) was declared payable to Shareholders registered at 31st December, 1952.

VILLAGE MAIN REEF GOLD MINING COMPANY (1934) LIMITED

PRODUCTION

Tons treated : 102,450 yielding 15,827 ounces fine of gold

	Revenue from Gold	Working Costs	Working Profit for Quarter	Per ton treated
	£197,171	£153,356	£43,815	38s. 6d. 29s. 11d. (193s. 9d. per ounce fine) 8s. 7d.

Working Costs per ton, 29s. 11d., include 5s. 11d. in respect of development expenditure.

In addition to the above Revenue, £4,353 accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the three months October to December, 1952, inclusive.

The Working Profit for the Quarter, as shown above, does not take into consideration interest on loans, amounting to £315 for the quarter, nor the further amount, payable to the Government in Mining Taxation, estimated at £19,000 for the quarter.

CAPITAL EXPENDITURE

The Expenditure on Capital Account during the quarter amounted to £1,075.

DEVELOPMENT

9,040 feet of development were advanced during the quarter, and 2,929 feet of old drives and crosscuts were reconditioned. In addition, 1,768 feet of underground diamond-drilling were done as an aid to development.

DIVIDEND

A Dividend (No. 25) of 12 per cent. (1s. 8d. per share) was declared payable to Shareholders registered at 31st December, 1952.

VIRGINIA ORANGE FREE STATE GOLD MINING COMPANY, LIMITED

SHAFT SINKING

No. 1 VERTICAL SHAFT—Shaft sinking operations were recommenced on 13th November, 1952. The shaft was sunk 82 feet in quartzites of the Upper Witwatersrand System to a total depth of 3,992 feet. The shaft was concrete lined to a depth of 3,957 feet, of which 54 feet were accomplished during the quarter. The intersection in pilot holes of water-bearing fissures, requiring cementation, considerably delayed sinking operations.

No. 2 VERTICAL SHAFT was sunk 130 feet in quartzites of the Upper Witwatersrand System to a final depth of 3,274 feet. In addition 13,600 cubic feet were excavated in the cutting of a station at a depth of 3,176 feet to serve the 16th level, the shaft loading boxes and a sump and pump chamber at the shaft bottom. A holing between the shaft loading boxes and the main ore-pass from the 12th level has been effected. The shaft was concrete lined to a depth of 3,274 feet, of which 138 feet were accomplished during the quarter.

SHAFT EQUIPMENT

No. 1 SHAFT—The erection of the 4,400 H.P. Permanent Electric Winder has been completed and the Winder was brought into commission to serve the east compartment.

Preparations were commenced for equipping the shaft with concrete buntons and steel channel guides.

No. 2 SHAFT—The change-over in shaft arrangements from sinking to development operations was completed. The loading arrangements in the shaft were completed; detaching hooks and jack-catches were installed and the station platforms at the 12th and 16th levels were constructed.

DEVELOPMENT

Development at No. 2 Shaft was resumed on 10th November, 1952.

Development at No. 1 Shaft was stopped temporarily on 12th November, 1952, in order to expedite the sinking of this shaft to its final depth.

The intersection in pilot holes of water-bearing fissures, requiring cementation, considerably retarded development operations at both No. 1 and No. 2 Shafts.

A total of 4,116 feet of development was accomplished during the quarter and, in addition, 24,475 cubic feet were excavated in pump chambers, sumps and in service bays.

The following are the results of the quarter's development :—

	No. 1 Shaft	No. 2 Shaft	Totals and Averages
Footage advanced	2,223	1,893	4,116
Footage on Reef	1,525	333	1,858
Footage Sampled	1,615	340	1,955
Payable Footage Sampled—			
Payable	780	55	835
Percentage Payable	48.3	16.2	42.7
Channel Width—Inches	45.1	39.9	44.8
Channel Value—Dwt.	7.05	7.54	7.08
In.-Dwt.	318	301	317

(The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

REDUCTION PLANT

Major construction work which was temporarily suspended in March, 1952, will now be resumed.

MINE BUILDINGS AND PLANT

Work is proceeding on extensions to the Electricity Supply Commission sub-station at No. 1 Shaft.

LABOUR

The Labour Strength at the end of the quarter was :—Europeans, 248; Natives, 1,291.

CAPITAL EXPENDITURE

Capital Expenditure amounting to £269,429 was incurred during the quarter on shaft sinking, buildings and plant.

The total Capital Expenditure, including preliminary expenses, incurred to 31st December, 1952, amounted to £5,632,493.

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